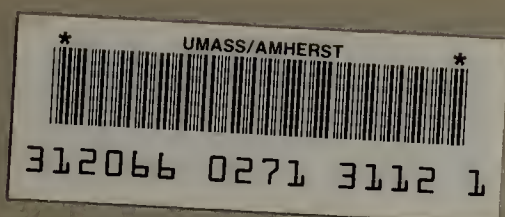


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FIFTEENTH ANNUAL REPORT
ON
VOCATIONAL EDUCATION
IN
MASSACHUSETTS

1984

PREPARED BY
THE MASSACHUSETTS ADVISORY COUNCIL
ON
VOCATIONAL-TECHNICAL EDUCATION

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Ms. Mary Ellen Smith, Chair
Board of Education
Commonwealth of Massachusetts
Department of Education
1385 Hancock Street
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Dear Ms. Smith:

The Massachusetts Advisory Council on Vocational-Technical Education is required, under Section 105 of Public Law 94-482, to prepare an annual report outlining the Council's assessment of the degree to which the vocational education system is meeting the needs of the Commonwealth's citizens, and to make recommendations for change, where appropriate. The Annual Report is addressed to the Board of Education, which then must submit it to the U.S. Department of Education, together with the Board's responses to the State Council's recommendations.

The Council is pleased to present its Fifteenth Annual Report, covering calendar year 1984. The Council appreciates the excellent working relationship we have with your Board and with the staff of the Division of Occupational Education. We hope that our Report and recommendations will assist the Board in its efforts to strengthen the quality of vocational education in Massachusetts.

Respectfully submitted
for the Council,

Charles A. Schuetz

Charles A. Schuetz
Chair

PREFACE

A. COUNCIL MISSION STATEMENT

Functioning independently, with funds provided by Congress, the Massachusetts Advisory Council on Vocational-Technical Education (the Council) has responsibility for assisting the State Board of Education (the Board) in formulating statewide vocational education policy by:

- . Advising the Board on the development of the State Plan for Vocational Education, including the preparation of long-range and yearly program plans;
- . Advising the Board on policy matters arising from implementation of the State Plan;
- . Evaluating federally funded vocational education programs in terms of the goals and objectives contained in the State Plan;
- . Recommending such changes in programs and services as may be warranted by the above-mentioned evaluations;
- . Holding public meetings at which members of the general public are given the opportunity to express their views concerning vocational education;
- . Advocating measures to guarantee that all citi-

zens of Massachusetts will have equal access to vocational training which is realistic in light of actual and projected opportunities for gainful employment and which is suited to their needs; and

- . Recommending, either independently or jointly with the Board and/or other relevant state agencies, needed changes in vocational education legislation and funding.

The need for an independent, unbiased, concerned, knowledgeable, and representative citizens' group to serve as an advisory body to professional educators and to the government agencies responsible for educational policy long has been recognized. But the value and effectiveness of the Council stems from bringing to the attention of the Board and other interested parties the unmet needs and unresolved issues of vocational education in Massachusetts. Obviously, this must be a cooperative venture among policy planners, administrators and the Council. The most effective advocacy will occur when the Council joins with the Board as a partner in bringing about necessary changes in vocational education programs, priorities, legislation and funding.

B. COUNCIL GOALS

1. Effective involvement of citizens in policy making and resource allocation for vocational education.
2. Clear understanding and acceptance by policy makers of vocational education as a top priority and critical aspect of public education, at all levels.
3. Equal access to quality vocational education for all citizens.
4. Increased state, local and federal financial support for vocational education.
5. Greater general awareness of the role of vocational education in promoting economic development.
6. More comprehensive and realistic planning for vocational education, including better coordination of vocational education with other elements of the employment and training system.
7. Improved evaluation of vocational education programs, toward the end of enhancing their quality and matching them to opportunities for gainful employment.

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EXECUTIVE SUMMARY AND RECOMMENDATIONS

1984 ANNUAL REPORT of the MASSACHUSETTS ADVISORY COUNCIL on VOCATIONAL-TECHNICAL EDUCATION

INTRODUCTION

Pursuant to its mandate under Public Law 94-482 (the Education Amendments of 1976), the 1984 Annual Report of the Massachusetts Advisory Council on Vocational-Technical Education (the Council) evaluated the effectiveness of occupational education programs, services and activities carried out in the Commonwealth of Massachusetts during the 1983-84 school year.

This Report is based on Council observations, information distributed by the Division of Occupational Education (the Division) and other state agencies, concerns expressed by citizens at public meetings, discussions with educators, contractual studies commissioned by the Council, and on research conducted by Council staff.

I. THE OCCUPATIONAL EDUCATION DELIVERY SYSTEM

Occupational education is a key part of the Commonwealth's education system. It is estimated that about 550 different institutions in Massachusetts offer programs in more than 100 occupational fields that require less than a four year college degree, ranging from electronic technician to nurse's aide. At the secondary level, public and private comprehensive and vocational

high schools represent the bulk of these providers. At the post-secondary level (i.e., beyond grade 12), occupational education is offered by community and junior colleges, regional vocational high schools, public and private noncollegiate post-secondary schools, correspondence schools, correctional institutions and by various manpower development and training institutions too numerous to list.

Priority Populations

The goals of access to and equality in occupational education, emphasizing programs and services for people with above-average needs (notably, economically disadvantaged individuals, especially those who are females, members of racial/ethnic minority groups, or handicapped) have been and will continue to be major State priorities. Policies, goals and procedures for ensuring that all students are afforded equal access to occupational education programs are set forth in great detail in the State Plan for Occupational Education in Massachusetts, Fiscal Years 1983-1987. As part of its equity program, the Division of Occupational Education recently has developed projects to recruit priority students into vocational schools; to provide inservice

training to teachers, counselors and administrators; to examine schools' admissions policies and procedures; and to develop competency-based curricula.

II. THE GOVERNANCE OF OCCUPATIONAL EDUCATION IN MASSACHUSETTS

Board of education, Department of Education, and Division of Occupational Education

In Massachusetts, the State Board of Education also is the State Board of Occupational Education. The Board's policy is implemented by the Department of Education, headed by the Commissioner of Education. Occupational education policy is implemented specifically through the Department's Division of Occupational Education, headed by an associate commissioner. The Division of Occupational Education has broad authority to establish and enforce state and federal policies and to expend state and federal funds for occupational education programs at the presecondary, secondary and postsecondary levels.

Governor's Special Assistant for Educational Affairs

The Governor's Special Assistant for Educational Affairs is responsible for making budget and policy recommendations to the Governor concerning all levels and types of education, including occupational education. The Special Assistant seeks to increase coordination among the various segments of public education and also makes recommendations for appointments to the many councils, commissions and boards concerned

with education in Massachusetts.

Secretary for Economic Affairs

The Secretary for Economic Affairs is responsible for the development of commerce and industry in the State, for the Division of Employment Security and for employment and training programs, such as the JTPA, which is administered by the Office of Training and Employment Policy (OTEP).

Job Training Partnership Act

The federal Job Training Partnership Act, which became effective in 1983, combines federal, state and local resources to provide job training to economically disadvantaged and long-term unemployed people. The business sector has equal responsibility with government in deciding how funds will be administered and what programs will be offered. The JTPA grant includes a specific set-aside (8% of Title IIA) for coordinating job training programs with occupational education programs. The Governor is responsible for coordinating state and local job training programs with all other publicly funded programs, including occupational education.

Commission for Occupational Education

The same statute that created the Division of Occupational Education within the Department of Education created the sixteen member Commission which, by law, is comprised of a cross-section

of people involved in occupational education and is advisory to the State Board of Education through the Division of Occupational Education.

The Commission recommends to the Board of Education policies and procedures regarding the formulation, administration, implementation and supervision of the State Plan for Occupational Education. The Commission also suggests new programs, reports its evaluations of existing ones, and recommends program changes.

State Advisory Council on Vocational-Technical Education

The Advisory Council initially was mandated by the Vocational Education Amendments of 1968 (P.L. 90-576). Superseding federal laws were issued during the ensuing years and, as of this writing, the SACVE (as the State Advisory Councils on Vocational Education have been known), is in the process of transition to the State Council on Vocational Education (SCOVE).

Whereas the SACVE had a minimum of twenty members, representing twenty federally mandated categories, the SCOVE membership is fixed at thirteen. The majority of the SACVE members were to be non-educators; the majority of the SCOVE members are to be private sector employees. Responsibilities common to both the SACVE and the SCOVE include participating in the development and review of the State Plan, consulting on the establishment of evaluation criteria and analyzing the distribution of federal monies to

vocational education programs throughout the State. The expanded responsibilities of the SCOVE include increased focus on the utilization of organized labor and the private sector in the conduct of vocational education programs.

Board of Regents

Appointed by the Governor, the fifteen member Board of Regents oversees the state's public universities and colleges. Reporting to the Board are 28 separate, nine-member trustee boards, representing each of the ten state colleges, fifteen community colleges and the University of Massachusetts, the University of Lowell and Southeastern Massachusetts University. The Board of Regents determines budget allotments, closings/expansions, curriculum, tuition and staff salaries, to name but a few examples of its broad activity.

Associations of Private or Proprietary Institutions

The three major organizations of private and/or proprietary post-secondary institutions in Massachusetts are all voluntary membership organizations.

The Association of Independent Colleges and Universities in Massachusetts (AICUM), is comprised of private, nonprofit, independent colleges and universities in Massachusetts which are concerned about the growth of the public sector in Massachusetts, the duplication of educational resources and the support of the public sector at the expense of the private sector. AICUM gives

them an opportunity to express their concerns in a joint and organized fashion.

The Association of Business Schools and the Association of Private Schools both have memberships comprised of nonprofit and proprietary private career schools. The Associations thus far have functioned more as services to their members than as lobbying forces to affect policy decisions about postsecondary education in the Commonwealth.

Veterans Administration

The Veterans Administration (VA) provides funds to students enrolled in approved postsecondary institutions. It does not provide funds directly to institutions or organizations.

Occupational Education by Employers and Labor Unions

Individual employers and labor unions provide training to their employees and members through such umbrella organizations as the Associated Industries of Massachusetts and the AFL-CIO Regional Office for the New England States. Apprenticeship programs in cooperation with unions always have been popular.

The Great and General Court

The General Court of Massachusetts (the State Legislature) obviously has a significant role in public education. By the enactment or amendment of education statutes, by its taxing authority and appropriations responsibilities, and by its post-audit and monitoring powers, the Legislature can pro-

mote or influence change in the public education system. It must be recognized as a critical factor in the governance and coordination of all education, including occupational education.

III. TEACHERS

The occupational education teacher today faces new challenges and must assume a myriad of responsibilities. As the idea grows that college is not necessarily the place for everyone, and as economic and technological change accelerate, professional educators constantly must upgrade pre-service and in-service programs to keep themselves current. In addition, occupational educators now are being called upon to produce graduates with stronger academic skills and better understanding of broad technical principles.

At the present time, Massachusetts is experiencing a shortage of qualified teachers in several occupational areas, especially the technical fields. In great part, this shortage can be attributed to starting salaries that are not even close to being competitive with those offered in the private sector. This creates a curious paradox, in that business and industry attract talented people away from teaching, while at the same time criticizing occupational education for not producing enough highly skilled graduates ready to fill vital positions.

IV. EQUIPMENT AND CURRICULUM

The application of advanced technology to the work place is

changing the kinds of knowledge and skills workers need. In the past, occupational education has prepared people for both entry level and advanced level jobs using tools and equipment that were comparable with those used in business and industry. However, rapid technological change, higher costs and limited budgets have made the provision of relevant instructional equipment increasingly difficult. This trend is especially disturbing in programs preparing students for computer occupations, engineering technologies, electronics-related jobs, trade and technical positions involving the adaptation, installation, operation or maintenance of automated industrial equipment, and medical and health-related occupations.

The challenge occupational educators face with respect to equipment also confronts them on the vital matter of curriculum content. The continuing influence on the American economy of computer and communications technologies is exerting strong pressure on occupational education to develop a more comprehensive instructional model, with greater emphasis on reading, science, math, oral and written expression, and problem solving. Central to the debate on curriculum revitalization is the idea of a "core of competencies" that are essential not only for either immediate employment or going on to college, but also for adaptability and life-long learning up to the limit of one's potential. Occupational educators are designing new curricula which go beyond traditional, job-specific competencies to include higher levels

of academic competencies, with greater emphasis on the general principles underlying a specific occupational field.

V. COST-EFFECTIVENESS OF OCCUPATIONAL EDUCATION

Financing of occupational education combines resources from local, state and federal levels, with the heavier contributions coming from local and state sources. In fiscal year 1984, local/state sources accounted for 94% of all funds spent on occupational education in Massachusetts.

Local funds come primarily from real estate taxes which, increasingly, are constrained by the tax limiting measure passed by Massachusetts voters in 1980 -- Proposition 2-1/2. Local funds probably account for about 65% of the cost of occupational education.

State financial assistance is distributed under Chapter 70 of the Massachusetts General Laws, which is designed both to reduce the reliance on local property taxes in financing public schools and to equalize per pupil expenditures across the Commonwealth. A system of "pupil weights" is used, under which the State recognizes that some educational programs cost more than others.

Federal funds are awarded on an annual basis in conjunction with a State Plan for Occupational Education, prepared by the Division of Occupational Education and submitted to the U.S. Education Department. The federal monies are allocated to the Division in two major categories:

those for state programs and those for programs of national significance. The bulk of the money is in state programs.

Quality occupational education can be expensive because it requires competent teachers current in their fields, state-of-the-art equipment, constantly revised curricula, rigorous performance standards, relatively small class size and relatively high operating costs. But the return on investment is impressive by any yardstick: better jobs and higher wages, higher productivity, improved competitive position, reduced poverty and welfare dependency, a better-educated citizenry, and a host of other returns, both economic and non-economic, to the Commonwealth.

VI. ONGOING ISSUES AND CONCERNS

State Plan

Although there has been some improvement in the State Plan, it still falls short of being a readable, comprehensive document in which needs assessment is fully integrated with goals, activities and allocations of resources. In particular, the federal contribution, which is six percent of the total spent on occupational education and is focused on federal priorities, should be set forth clearly within a state policy framework that drives the other ninety-four percent. In the absence of a state policy framework, the State Plan will remain largely a compliance document.

The Council sees two major reasons for the inadequacy of state plan-

ning for occupational education. The first is that the Board of Education is grappling with many complex issues and simply does not have the resources to give occupational education the attention it requires. The second reason is that the State law and regulations governing occupational education are out-of-date.

In addition, the Council finds that the delivery system for occupational education and employment training is fragmented, with various segments competing for funds and students and that the State Board of Education does not seem to regard occupational education to be equally as important as academic education. This is not to say that Massachusetts offers inferior programs, for we believe that the Commonwealth still has one of the best delivery systems in the nation. But the Massachusetts economy is highly dependent on human resource development to remain competitive in world and domestic markets. What was good in the past can become obsolete quickly in today's economic climate.

The Accountability Report

The Council was consulted in the development of the FY 1983 Accountability Report for occupational education, as required by P.L. 94-482, section 108. Our analysis of quantitative data indicates that the State is complying with federal law and regulations. However, the Accountability Report does not say how evaluation information was used to improve occupational education statewide, or how such information was used to reassess current State

occupational education policy. There is no clear, narrative statement of what was planned, what was achieved, and what changes are needed.

Coordination of Occupational Education With Training Programs Under JTPA

The Council reviewed the Massachusetts Governor's Coordination and Special Plan For The Job Training Partnership Act (JTPA), dated May 15, 1984, covering program year's 1984 and 1985, and found it to be exemplary. There has been increased coordination in the Commonwealth between the occupational education and the JTPA delivery systems, especially at the state-agency level.

In each of the Massachusetts Department of Education regions a staff person has been hired to work with the JTPA system and there are projects involving school-to-work programs in thirty communities serving 1,900 students. While it is too soon to judge the long term success of these cooperative agreements, it is apparent that the results thus far are uneven across the State. Some partnerships between Private Industry Councils (PICs) and vocational schools are productive; others are little more than a continuation under JTPA of the same programs and infrastructure that existed under CETA.

Funding

Occupational education often costs more than strictly academic programs do, for a variety of reasons, including:

- acquisition, maintenance and operating costs of equipment
- greater number of student contact-hours
- higher salaries needed to attract qualified instructors, especially in technical fields such as electronics
- lower student-faculty ratio
- dual facilities: shop and classroom space

Massachusetts built an outstanding occupational education system on the premise that the best way to finance this greater-than-average cost was through a partnership between state and local sources, with both contributing fifty percent. However, the 50/50 partnership concept was abandoned by the legislature in 1978, and in 1980 the Massachusetts voters passed the tax limiting measure known as Proposition 2-1/2. The combined effect has been to erode the capacity of local educational agencies to offer competitive salaries, to keep up-to-date in equipment, and to offer new programs to meet the needs of technology-intensive industries.

Any valid proposal to restructure the way public education is financed in Massachusetts must encompass equity, excellence, diversity and local autonomy. The Council supports the goals of raising State education aid to the national average of fifty percent and distributing such aid in a manner calculated to equalize per-pupil spending in the Commonwealth. We also believe that

State education aid should be protected from diversion at the local level, to uses other than education.

Consideration should be given to some form of categorical aid, based on incentives to keep occupational education current with labor market demand.

Consideration also should be given to a line item appropriation in the State budget for replacing and upgrading vocational equipment, to be made available to school districts on a dollar-for-dollar matching basis.

Since there has been a beginning to business-school partnership, this effort should be increased to provide relevant instructional equipment and software. This will require a considerable additional investment of time, effort, money and dialogue, from both business and education.

Standards In Occupational Education

The continuing influence on the American economy of computer and communications technologies is exerting strong pressure on occupational education today. A major goal of curriculum revitalization is to develop a core of competencies that are essential for immediate employment, or going on to college, or for life-long learning up to the limit of one's potential. The overriding issue in curriculum revision is how to address the impact of new technologies on the skill requirements of all industries and occupations -- not merely those labeled "high tech."

A recurring theme from the Council's public hearings is the complaint from parents that occupational education programs do not demand enough from students in their academic classes. Deficiencies in the basic academic skills component of occupational education produce high school graduates ill-prepared for post-secondary training -- or for a four year college program should they decide they want it. We should be in the business of expanding students' career options, not limiting them.

An occupational education program should include hands-on skill training, academic preparation, theory and practice related to the occupation, and on-site work experience. The occupational education graduate should be no less well-prepared in basic academic competencies than is the college-bound graduate. Standards for employment-related competencies should be set with maximum involvement of business and industry.

Teacher Shortages

There is a general shortage of qualified instructors in most technology-related fields, at both secondary and postsecondary levels, because schools simply cannot match the salary and benefits package offered by private sector employers. The result is either a reduction in program quality, or an inability to offer certain programs essential to the Commonwealth's economic vitality.

In addition to the problem of recruiting and retaining instructors experienced in their occupa-

tional areas, however, there is the matter of teacher preparation. Requiring college degrees as a way to guarantee adequate pedagogical training is a tempting idea, but, unfortunately, a college degree does not ensure pedagogical excellence either for academic or occupational education teachers. The quality of teacher preparation varies considerably within the State. But more importantly, emphasizing higher education degrees and recent, continuous, full-time employment either discourages people with expertise in their occupations from entering teaching, or tempts them to enroll in quick and easy degree programs of dubious value.

VII. RECOMMENDATIONS

1. THE GOVERNOR, IN CONSULTATION WITH THE BOARD OF EDUCATION AND THE BOARD OF REGENTS, SHOULD APPOINT A SPECIAL COMMISSION TO EVALUATE STATE POLICY, LAW AND REGULATIONS PERTAINING TO OCCUPATIONAL EDUCATION, AND TO MAKE APPROPRIATE RECOMMENDATIONS.
2. A JOINT COMMITTEE ON OCCUPATIONAL EDUCATION AND EMPLOYMENT TRAINING SHOULD BE FORMED, WITH MEMBERS REPRESENTING THE BOARD OF EDUCATION, THE BOARD OF REGENTS, THE OFFICE OF ECONOMIC AFFAIRS, AND APPROPRIATE SEGMENTS OF THE GENERAL PUBLIC.
3. THE STATE EDUCATION AID APPROPRIATION SHOULD BE RAISED TO THE NATIONAL AVERAGE OF FIFTY PERCENT AND SHOULD BE DISTRIBUTED IN A MANNER CALCULATED TO EQUALIZE PER-PUPIL SPENDING IN THE COMMONWEALTH. FURTHER, STATE EDUCATION AID SHOULD BE PROTECTED FROM DIVERSION AT THE LOCAL LEVEL TO USES OTHER THAN EDUCATION.
4. THE STATE BOARD OF EDUCATION SHOULD BE GIVEN THE AUTHORITY TO ESTABLISH MINIMUM COMPETENCY STANDARDS FOR GRADUATES OF OCCUPATIONAL EDUCATION PROGRAMS, INCLUDING APPROPRIATE ACADEMIC AND RELATED THEORY COMPETENCIES.
5. THE STATE SHOULD ESTABLISH AND FUND A "CENTER FOR TEACHER-TRAINING EXCELLENCE," WITH A MANDATE TO RESTRUCTURE THE SYSTEM OF OCCUPATIONAL EDUCATION TEACHER-TRAINING AND TO AGGRESSIVELY RECRUIT TEACHERS FOR ALL CAREER CLUSTERS REPRESENTED IN THE WORKFORCE.
6. THE GOALS OF ACCESS TO AND EQUALITY IN OCCUPATIONAL EDUCATION EMPHASIZING PROGRAMS AND SERVICES FOR PEOPLE WITH ABOVE-AVERAGE NEEDS (NOTABLY, ECONOMICALLY DISADVANTAGED INDIVIDUALS, ESPECIALLY THOSE WHO ARE ALSO FEMALE, HANDICAPPED, OR MEMBERS OF RACIAL/ETHNIC MINORITY GROUPS) SHOULD CONTINUE TO BE MAJOR STATE PRIORITIES.
7. THE BOARD OF EDUCATION SHOULD DIRECT THE DIVISION OF OCCUPATIONAL EDUCATION (IN CONCERT WITH THE OFFICE OF TRAINING & EMPLOYMENT POLICY, IF POSSIBLE) TO GATHER DATA DEMONSTRATING THE RELATIONSHIP, IF ANY, BETWEEN THE QUALITY AND AVAILABILITY OF VOCATIONAL EDUCATION AND OTHER EMPLOYMENT AND TRAINING PROGRAMS, AND THE RATE OF

BUSINESS START-UP, EXPANSION OR RELOCATION IN THE COMMONWEALTH OF MASSACHUSETTS.

8. THE BOARD OF EDUCATION SHOULD DIRECT THE DIVISION OF OCCUPATIONAL EDUCATION TO STATE ITS POSITION ON THE ROLE OF THE COMPREHENSIVE HIGH SCHOOL IN MASSACHUSETTS IN DELIVERING QUALITY VOCATIONAL EDUCATION, VIS-A-VIS THE FOLLOWING POINTS:

- A. IS VOCATIONAL (JOB SPECIFIC) PREPARATION BEST CARRIED OUT ON THE SECONDARY OR POSTSECONDARY LEVEL OR BY SOME MIXTURE OF THE TWO. WHY?
- B. WOULD OFFERING ALL VOCATIONAL EXPLORATORY PROGRAMS AT THE 9TH AND 10TH GRADE LEVELS IN LOCAL HIGH SCHOOLS AND INTENSIVE SKILLS TRAINING PROGRAMS AT THE 11TH AND 12TH GRADE LEVELS IN REGIONAL VOCATIONAL SCHOOLS BETTER MEET STUDENTS' NEEDS AND MAKE FOR A MORE COST-EFFECTIVE DELIVERY SYSTEM? WHY OR WHY NOT?
- C. (HOW) CAN INDUSTRIAL ARTS AND OTHER OCCUPATIONAL EDUCATION PROGRAMS OFFERED IN COMPREHENSIVE HIGH SCHOOLS BE RESTRUCTURED TO MAKE THEM MORE SKILLS INTENSIVE.
- D. SHOULD INDUSTRIAL ARTS RECEIVE FEDERAL FUNDING UNDER P.L. 94-482? WHY OR WHY NOT?
- E. SHOULD THE PRESENT DEFINITION OF WHAT CONSTITUTES VOCATIONAL EDUCATION UNDER MASSACHU-

SETTS GENERAL LAWS CHAPTER 74 BE BROADENED? WHY OR WHY NOT?

- F. HOW MIGHT CURRENT STATE LAWS AND REGULATIONS REGARDING APPROVED VOCATIONAL PROGRAMS AND REQUIRED SUBJECTS BE MODIFIED IN ORDER TO GUARANTEE FULL ACCESS BY ALL STUDENTS TO VOCATIONAL OFFERINGS IN COMPREHENSIVE HIGH SCHOOLS?
- G. HOW CAN TRUE ARTICULATION AND COOPERATION BETWEEN OCCUPATIONAL AND VOCATIONAL PROGRAMS AND BETWEEN OCCUPATIONAL/VOCATIONAL PROGRAMS AND THE GENERAL EDUCATION COMMUNITY BEST BE EFFECTED?

INTRODUCTION

Occupational/vocational education in Massachusetts and the United States has its roots in the institution of apprenticeship and in the Manual Training Movement of the late nineteenth century. During the first two decades of the twentieth century, demands from management and labor for skilled manpower, and educators' concern over the excessive dropout rate associated with the traditional classical curriculum, resulted in widespread acceptance of occupational education as worthy of public support.

With its rich educational heritage, Massachusetts was an early leader in the fight to make occupational education legitimate, and by 1910 had developed a comprehensive system for occupational education in the public schools that served as a model for other states. The Commonwealth's educators played a key role in the campaign for federal aid to occupational education, culminating with passage of the Smith-Hughes Act of 1917 -- a landmark piece of federal legislation that remains in effect today.

Despite recent cutbacks in local budgets, there still is widespread support among the general public for occupational education. For example, a recent statewide survey commissioned by the Boston Globe indicates that, faced with a choice of better schools or lower taxes, an overwhelming majority of Massachusetts citizens favors improving the schools.⁽¹⁾ The most recent nationwide Gallup Poll of the public's attitude toward the public schools evidences strong support for occupational education as a required subject for public high school students.⁽²⁾ The National Center for Research in Vocational Education's latest findings on the effectiveness of occupational education programs shows that the general public, employers and legislators alike view occupational education favorably.⁽³⁾ A recent survey of Massachusetts employers also shows a high degree of satisfaction with the skills of secondary occupational education graduates.⁽⁴⁾

Clearly, most people continue to believe that formal, employment-related education programs offer economic benefits both to the individual, in the form of a better job and higher wage, and to society, in the form of improved productivity. This belief is reflected in enrollments and expenditures. In the Commonwealth of Massachusetts, approximately 350,000 individuals are enrolled in some form of publicly supported occupational education. Total expenditures for occupational education are \$230 million, of which \$215 million are state and local funds, and \$15 million are federal funds.

Today, however, occupational education is faced with economic, technological and demographic changes requiring new priorities and new programs. Even those who express general satisfaction with the results of occupational education say that it should be more closely linked to business, that it must give greater emphasis to basic academic skills, and that programs must keep up to date with changing times.

At this point, two caveats must be introduced. The first concerns terminology -- specifically, the difference between occupational education and vocational education. The term "occupational education" is a general concept encompassing a wide range of employment-related training or education. It includes, for example, career guidance, exploratory programs and programs in consumer and homemaking education. On the other hand, the term "vocational education" usually is reserved for intensive skills training programs designed to prepare students for entry level jobs such as plumbing, auto mechanics or electronics technology. Practitioners often use the terms interchangeably but the general public refers to everything as "vocational education." This report uses the term "occupational education" in its broadest sense; i.e., all programs conducted by secondary and postsecondary educational agencies to prepare youth and adults for work.

The distinction is of more than academic interest because programs which are eligible for special state financial assistance are defined by state law as "education of which the primary purpose is to fit pupils for profitable employment";⁽⁵⁾ i.e., vocational education. Such programs are subject to state approval based on criteria established by state law and regulations. Programs eligible for federal aid, however, fall under the broader category of "occupational education" as defined under much less restrictive federal statutes. Thus, the State apportions some of the federal funds it receives to programs which do not meet state criteria and which are not eligible for special state aid when the federal funding runs out. The State classifies such programs as "occupational education."

A second caveat concerns data. Although there has been dramatic improvement in the State's data collection and processing capacity over the last few years, the State does not collect data on private, post-secondary programs nor on employer-based programs, so that no completely accurate count exists of total enrollments in all programs that conceivably might be called "occupational." Some reasonable estimates can be made, however, and valid, reliable data do exist for the publicly supported programs that account for the bulk of enrollments.

A significant difference in enrollment data appears, depending on whether "occupational" education or "vocational" education is the denoting term. For example, counting only "vocational education" enrollments as defined by state law (Chapter 74), in 1982-83 there were 46,776 students enrolled at the secondary level in Massachusetts schools.⁽⁶⁾ Using the less stringent federal definition of "occupational education," the total is 203,748.⁽⁷⁾

I. THE OCCUPATIONAL EDUCATION DELIVERY SYSTEM

Occupational education in Massachusetts is provided by several different kinds of institutions, in a variety of settings, to students with diverse abilities and goals. In fact, there is so much variety that making any generalization at all about the occupational education "delivery system" is difficult.

Providers of Occupational Education

In Massachusetts, the following major institutions offer occupational education:

- o comprehensive high schools, both local and regional
- o vocational high schools, both local and regional
- o community colleges
- o proprietary schools
- o apprenticeship programs
- o federally funded programs under the Job Training Partnership Act
- o employer-based programs

Occupational education is a key part of the Commonwealth's education system. It is estimated that about 550 different institutions in Massachusetts offer programs in more than 100 occupational fields that require less than a four year college degree, ranging from electronics technician to nurse's aide. At the secondary level, public and private comprehensive and vocational high schools represent the bulk of these providers. At the postsecondary level (i.e., beyond grade 12), occupational education is offered by community and junior colleges, regional vocational high schools, public and private non-collegiate postsecondary schools, correspondence schools, correctional institutions and by various manpower development and training institutions too numerous to list.

While all of the above are part of the delivery system, the Council has concerned itself, for the most part, with publicly supported programs. About 40,000 students are estimated to be enrolled in postsecondary proprietary schools, independent nonprofit schools, correspondence courses, and parochial schools. In addition, there may be as many as 10,000 students enrolled in job training programs funded by the federal Department of Labor, and in apprenticeship programs. The data for such programs are unreliable, however, and in any event a description of them would increase substantially the length of this report.

The core of occupational education in Massachusetts is and always has been at the secondary level. Of the 550 provider institutions offering occupational education programs, approximately one half are at the secondary level. The largest single type of provider is the comprehensive high school, with 201 schools.

Programs and Enrollments

Although Massachusetts State law (M.G.L., Chapter 74) defines vocational education broadly as "education of which the primary purpose is to fit pupils for profitable employment," it also restricts the categories of vocational education eligible for special state financial aid (see Chapter V of this report) to the following: distributive occupations, industrial, agricultural, household arts education, practical arts classes and practical nurse training.

Federal financial assistance is provided under the Vocational Education Act, Public Law 94-482. The federal definition of what kinds of programs are eligible for assistance is less restrictive than is the State's. Hence, in any description of programs, a distinction must be made between Chapter 74 (State and locally funded) and P.L. 94-482 (federally funded) programs.

In Massachusetts, occupational education is offered in nine broad occupational areas:

- (1) Agriculture
- (2) Distribution
- (3) Health
- (4) Occupational Home Economics
- (5) Technical
- (6) Trade and Industrial
- (7) Office
- (8) Home Economics
- (9) Industrial Arts

Table 1 displays enrollment data for publicly supported institutions. Excluding industrial arts and non-occupational consumer and homemaking programs, almost 60% of all enrollments is in office occupations. The second largest enrollment, about 22% of the total, is in trade and industrial programs.

These broad occupational areas encompass an impressive array of specific instructional programs (see Table 2). Overall, the Commonwealth is providing meaningful options for those who are motivated to seek education having an occupational focus.

Using the broadest possible definition of occupational education (which would include home economics, industrial arts and business education), approximately 203,748 people in Massachusetts currently are enrolled in secondary programs. About 45% of the secondary enrollment -- 92,133 -- is enrolled in office occupation courses, mostly typing, accounting and similar courses, in comprehensive high schools. The largest part of the remainder -- 39,191 -- is enrolled in "trade and industrial" courses, a broad category which includes among its many offerings auto mechanics, carpentry, graphic arts and electronics. The third largest enrollment at the secondary level

is distributive occupations (e.g., retailing and marketing), with an enrollment of 4,777.

Postsecondary education (i.e., grades 13 & 14) is offered in vocational high schools and community colleges. Although many school districts have cut back or even eliminated entirely their postsecondary programs (as a result of Proposition 2 1/2), currently 33,400 people are enrolled in such programs, 49% of them in office occupations. The second largest enrollment is in technical occupations, especially programming and electronics. The postsecondary level is also an important source of trained people for health occupations. About 5,200 students in occupational education are learning such skills as practical nursing, dental and medical laboratory assisting, and radiologic technology. It may be noted that almost 70% of the health occupations enrollment is found at the postsecondary level.

The community colleges constitute a fast-growing component of postsecondary occupational education. Whereas in 1969 Massachusetts had 12 regional community colleges enrolling 7,183 full-time day students in occupational programs, today there are 15 such institutions enrolling almost 21,000 day occupational education students and 10,000 continuing education students.

Student Characteristics

FY 1982 data (see Table 3) show that sex and ethnic characteristics of students enrolled in Chapter 74 and P.L. 94-482 programs were as follows:

Chapter 74 Programs (State and locally funded)

Of a total of 46,734 students in Grades 9-12, 31,717 (68%) were male, and 15,017 (32%) were female.

In terms of ethnic origin, the statistics were:

American Indian/Alaskan native	0.24%
Asian American/Pacific Islander	0.79%
Black, not Hispanic	5.69%
Hispanic, not Black	3.70%
White, not Hispanic	89.58%

P.L. 94-482 Programs (federally funded)

Of 121,351 students in Grades 9-12 and postsecondary programs, 61,221 (50.5%) were male, and 60,130 (49.5%) were female.

Ethnic origin:

American Indian/Alaskan native	0.46%
Asian American/Pacific Islander	0.88%
Black, not Hispanic	6.83%
Hispanic, not Black	5.02%
White, not Hispanic	84.39%
Other	2.40%

Completers

Of the 11,087 students who completed Chapter 74 vocational training programs at the secondary level in June of 1981, 64% responded to a survey on their current employment status one year later. 3,765 (53%) of the respondents reported that they were employed in a field related to their training, and another 1,177 (16.5%) reported employment in an occupational field not related to their training. 1,667 (23.5%) were pursuing additional training/education or were in military service. The balance of 460 (6.5%) were unemployed or not in the labor force.

Statistics for students who had completed postsecondary training in 1981 show that of 1,614 postsecondary completers, 1,140 (71%) were employed in a field related to their training one year after completion, and 60 (4%) were employed in a field not related to their training. 76 (5%) were continuing their education or in military service, and 55 (3%) were unemployed or not in the labor force.

Sex Data

Chapter 74 programs and P.L. 94-482 programs for 1981-82 school year.

	Grades 9-10		Grades 11-12		Total	
	M	F	M	F	M	F
Chapter 74	70.3%	29.7%	65.6%	34.4%	67.9%	32.1%
P.L. 94-482	53.1%	46.9%	48.9%	51.1%	50.7%	49.3%

Priority Populations

The goals of access to and equality in occupational education, emphasizing programs and services for people with above-average needs (notably, economically disadvantaged individuals, especially those who are members of racial/ethnic minority groups, females or handicapped) have been and will continue to be major State priorities. Policies, goals and procedures for ensuring that all students are afforded equal access to occupational education programs are set forth in great detail in the State Plan for Occupational Education in Massachusetts, Fiscal Years 1983-1987 (pp. 3-20). As part of its equity program, the Division of Occupational Education recently has developed projects to recruit priority students into vocational schools;

to provide inservice training to teachers, counselors and administrators; to examine schools' admissions policies and procedures; and to develop competency-based curricula (see Table 4).

Given the constraints of Proposition 2 1/2 and inflation, local units of government will be hard pressed to find the additional revenue required to fund special programs for priority populations. Breaking down artificial barriers to employment is good social policy, and using public funds to provide basic education and entry-level skills is good economic policy. For aside from the simple question of justice, the long-term economic success of the Commonwealth depends on the degree to which its skilled work force can be expanded and upgraded to meet relentless competition, in both domestic and international markets. And since the Massachusetts workforce will grow much less rapidly in the next two decades than in the 1960s and 1970s, while the relative proportion of racial/ethnic minorities and women in the workforce will increase, the skilled people the Commonwealth needs will have to come from a pool of people who need to be better served by the traditional employment and training system.

II. THE GOVERNANCE OF OCCUPATIONAL EDUCATION IN MASSACHUSETTS

To better understand the governance and coordination of occupational education in the Commonwealth, the reader will find it helpful to keep certain facts in mind.

First, most of the resources for occupational education are allocated to the secondary level. This means that the State Board of Education and the State Department of Education are the major policy formulators and administrators of occupational education in Massachusetts.

Second, although the State ensures that school districts adhere to state and federal laws dealing with education, and the State can withhold funds if laws are violated, local school districts are largely autonomous with respect to their own education programs and services.

Third, occupational education programs at the secondary level are provided by comprehensive high schools, independent trade schools, city trade/ vocational schools, agricultural schools and regional vocational-technical high schools. At the postsecondary level, programs are provided by community colleges, the regional vocational-technical high schools, state colleges and universities, community agencies, and by the Job Training Partnership Act, in a variety of ways.

Board of Education, Department of Education, and Division of Occupational Education

In Massachusetts, the State Board of Education also is the State Board of Occupational Education. The Board is comprised of twelve members appointed by the Governor, plus the Commissioner of Education appointed by the Board, and the Chancellor of the Board of Regents, who serves ex officio and has no vote.

The Board's policy is implemented by the Department of Education, headed by the Commissioner of Education. Occupational education policy is implemented specifically through the Department's Division of Occupational Education, headed by an associate commissioner. The Division of Occupational Education has broad authority to establish and enforce state and federal policies and to expend state and federal funds for occupational education programs at the presecondary, secondary and postsecondary levels. Massachusetts law mandates seven specific responsibilities of the Division:

1. Formulation of policy for the administration, implementation and supervision of the State Plan for occupational education;
2. Review and evaluation of all applications for federal and state funds for occupational education;

3. Provision of research and development which would improve, promote and expand occupational education in the Commonwealth;
4. Implementation of new programs throughout the Commonwealth;
5. Dissemination of the findings of the State Advisory Council on Vocational-Technical Education concerning the evaluation of existing and prospective occupational education programs, services and activities, including teacher training, and implementation of changes necessitated by such findings;
6. Development of necessary guidelines for the coordination, promotion, and establishment of programs of occupational education for the people of the Commonwealth, and for the training and upgrading of teachers for such programs; and
7. Determination, with the advice and consent of the Board of Education and the Board of Regents (see below), of the guidelines for the disposition of all federal funds for occupational education at the secondary and postsecondary levels.

In addition, with the enactment of the federal Job Training Partnership Act (JTPA), the Division of Occupational Education, and the JTPA "Service Delivery Areas" (units of local government with populations over 200,000), jointly define and cooperate on the delivery of occupational education to participants in various job training programs.

Governor's Special Assistant for Educational Affairs

The Governor's Special Assistant for Educational Affairs is responsible for making budget and policy recommendations to the Governor concerning all levels and types of education, including occupational education. The Special Assistant seeks to increase coordination among the various segments of public education and also makes recommendations for appointments to the many councils, commissions and boards concerned with education in Massachusetts.

Secretary for Economic Affairs

The Secretary for Economic Affairs is responsible for the development of commerce and industry in the State, for the Division of Employment Security and for employment and training programs, such as the JTPA, which is administered by the Office of Training and Employment Policy (OTEP).

The Governor's office has expressed a desire for more coordination among those responsible for employment and training and those responsible for education, in order to establish a more comprehensive and effective utilization of education and manpower funds.

Job Training Partnership Act

The federal Job Training Partnership Act, which became effective in 1983, combines federal, state and local resources to provide job training to economically disadvantaged and long-term unemployed people.

The business sector has equal responsibility with government in deciding how funds will be administered and what programs will be offered. The JTPA grant includes a specific set-aside (8% of Title IIA) for coordinating job training programs with occupational education programs. The Governor is responsible for coordinating state and local job training programs with all other publicly funded programs, including occupational education.

Commission for Occupational Education

The same statute that created the Division of Occupational Education within the Department of Education created the Commission. Ten members are appointed to the Commission by the Board of Education and six by the Board of Regents. By law, the Commission is comprised of a cross-section of people involved in occupational education and is advisory to the State Board of Education through the Division of Occupational Education.

The Commission recommends to the Board of Education policies and procedures regarding the formulation, administration, implementation and supervision of the State Plan for Occupational Education. The Commission also suggests new programs, reports its evaluations of existing ones, and recommends program changes.

State Advisory Council on Vocational-Technical Education

The Advisory Council initially was mandated by the Vocational Education Amendments of 1968 (P.L. 90-576). Superseding federal laws were issued during the ensuing years and, as of this writing the SACVE (as the State Advisory Councils on Vocational Education have been known), is in the process of transition to the State Council on Vocational Education (SCOVE).

Whereas the SACVE had a minimum of twenty members, representing twenty federally mandated categories, the SCOVE membership is fixed at thirteen. The majority of the SACVE members were to be non-educators; the majority of the SCOVE members are to be private sector employees. Responsibilities common to both the SACVE and the SCOVE include participating in the development and review of the State Plan, consulting on the establishment of evaluation criteria and analyzing the distribution of federal monies to vocational education programs throughout the State. The expanded responsibilities of the SCOVE include increased focus on the utilization of organized labor and the private sector in the conduct of vocational education programs.

Board of Regents

Appointed by the Governor, the 15 member Board of Regents oversees the state's public universities and colleges. Reporting to the Board are 28 separate, nine-member trustee boards, representing each of the 10 state colleges, 15 community colleges and the University of Massachusetts, the University of Lowell and Southeastern Massachusetts University. The Board of Regents determines budget allotments, closings/expansions, curriculum, tuition and staff salaries, to name but a few examples of its broad activity.

Associations of Private or Proprietary Institutions

The three major organizations of private and/or proprietary postsecondary institutions in Massachusetts are: the Association of Independent Colleges and Universities in Massachusetts (AICUM), the Massachusetts Association of Business Schools, and the Massachusetts Association of Private Schools.

AICUM is comprised of private, nonprofit, independent colleges and universities in Massachusetts. These institutions are concerned about the growth of the public sector in Massachusetts, the duplication of educational resources and the support of the public sector at the expense of the private sector, and AICUM gives them an opportunity to express their concerns in a joint and organized fashion.

The Association of Business Schools and the Association of Private Schools both have memberships comprised of nonprofit and proprietary private career schools. The Associations thus far have functioned more as services to their members than as lobbying forces to affect policy decisions about postsecondary education in the Commonwealth.

They, like AICUM, have no formal control or authority over their members; they are voluntary membership organizations. At best, they can hope only to influence their member institutions through peer pressure.

Veterans Administration

The Veterans Administration (VA) provides funds to students enrolled in approved postsecondary institutions. It does not provide funds directly to institutions or organizations.

Certain types of data must be provided by institutions that enroll veterans in order for them to receive VA benefits. Many of the same data also are required by the Office of Private Schools for license renewal.

Occupational Education by Employers and Labor Unions

Individual employers and labor unions provide training to their employees and members through such umbrella organizations as the Associated Industries of Massachusetts and the AFL-CIO Regional Office for the New England States. Apprenticeship programs in cooperation with unions always have been popular.

The Great and General Court

The General Court of Massachusetts (the State Legislature) obviously has a significant role in public education. By the enactment or amendment of education statutes, by its taxing authority and appropriations responsibilities, and by its post-audit and monitoring powers, the Legislature can promote or influence change in the public education system. It must be recognized as a critical factor in the governance and coordination of all education, including occupational education.

III. TEACHERS

The occupational education teacher today faces new challenges and must assume a myriad of responsibilities. As the idea grows that college is not necessarily the place for everyone, and as economic and technological change accelerate, professional educators constantly must upgrade pre-service and in-service programs to keep themselves current. In addition, occupational educators now are being called upon to produce graduates with stronger academic skills and better understanding of broad technical principles.

As the expectations of occupational education have changed, the training of its teachers also has undergone change. The current standards for vocational teacher approval in Massachusetts, found in the State's Chapter 74 regulations, fall under four general headings:

- (1) years of experience
- (2) competency
- (3) college credits
- (4) professional improvement activities

Documentation of Years in Trade and Education

Tradespersons who wish to become vocational education teachers must document that they have received a high school diploma or state equivalency certificate. In addition, they must have spent a minimum, regulated amount of time practicing in their trades. Specific requirements depend on the occupational area:

Trade and industry: requires six years of recent, full-time work experience. If a candidate has a bachelor's degree in the specific field for which approval is sought, the degree may be substituted for up to three years of trade experience. A master's degree in the specific field may be substituted for one additional year of experience in trade.

All other areas: require a bachelor's degree plus three years of experience in trade. However, credits specific to each field are required and vary according to the approval area. A master's degree may be substituted for one additional year of experience in trade.

Trade Competency Testing and Licensing

Trade and industrial candidates seeking provisional approval to teach must pass the statewide, written and practical examinations in their trades. If a license is necessary to practice a certain trade, teachers in that trade must have the necessary license.

Approved College Credits

The Division of Occupational Education determines the approved content for the mandated 18 semester hours of college credit. The state regulations do not specify that the credits must be in teacher preparation per se, although that is the generally accepted assumption. Presently, a set of eight approved course titles and outlines meets the vocational coursework requirement for full vocational teacher approval.

In order to maintain full approval as a vocational education teacher in Massachusetts, every two years each teacher must document that he or she has completed:

- o 60 hours of additional on-the-job experience, either paid or unpaid, but related to the occupational area taught; or
- o 3 semester hours of additional academic credit in an educational or technical area related to the teacher's instructional area.

At the present time, Massachusetts is experiencing a shortage of qualified teachers in several occupational areas, especially the technical fields. In great part, this shortage can be attributed to starting salaries that are not even close to being competitive with those offered in the private sector. This creates a curious paradox, in that business and industry attract talented people away from teaching, while at the same time criticizing occupational education for not producing enough highly skilled graduates ready to fill vital positions.

One solution, of course, is to establish salary levels which would attract talented people to the occupational education profession. Another solution would be more cooperative programs between occupational education and the private sector, in which the private sector could contribute to the development of a skilled labor force by making its qualified employees available as instructors.

In addition to improving salaries, the State needs to improve both its recruiting efforts and its teacher training programs. For example, three of the four teacher training programs currently available are under the auspices of the continuing education departments of the provider institutions: Fitchburg State College, U. Mass/Boston, and Westfield State College. Relegating occupational teacher education programs to continuing education departments dates from early concepts of occupational education's purpose and significance. These concepts no longer are relevant, when greater emphasis is being placed on basic academic skills, computer science, and the need for all students to understand principles and concepts of the technology they will encounter in the work place. Such far-reaching and ambitious goals mandate that teacher training institutions include in their complement full-time faculty members who are committed to teaching, curriculum design, research and evaluation in the field of occupational education.

IV. EQUIPMENT AND CURRICULUM

The application of advanced technology to the work place is changing the kinds of knowledge and skills workers need. In the past, occupational education has prepared people for both entry level and advanced level jobs using tools and equipment that were comparable with those used in business and industry. However, rapid technological change, higher costs and limited budgets have made the provision of relevant instructional equipment increasingly difficult. This trend is especially disturbing in programs preparing students for computer occupations, engineering technologies, electronics-related jobs, trade and technical positions involving the adaptation, installation, operation or maintenance of automated industrial equipment, and medical and health-related occupations.

Recent surveys indicate that equipment upgrading, replacement and maintenance are falling behind need, nationwide.⁽⁸⁾ Occupational education is finding it impossible to keep up with rapidly evolving technologies in robotics, micro-processing, word-processing, laser technology, fiber optics, computer-assisted drafting and design, computer-assisted manufacturing, and electro/mechanical technology. The slow pace of infusing new technology into occupational education programs has led some states to make equipment their number one priority. They realize that lack of instructionally relevant equipment not only erodes the quality of existing programs, but also causes occupational education to decide not to implement new programs which require expensive equipment.

In Massachusetts, state aid now received by occupational education programs is insufficient to keep up with new capital equipment needs. While federal aid can be used for equipment, the amount received is quite modest compared to the need. Loans and gifts from business and industry are much appreciated, but, in general, the pieces donated are the ones being replaced by the donor. And again, the need is far greater than the supply.

Local school capital equipment budgets for the purchase of machines, tools, and instruments are easy targets for budget cutting because the immediate consequence is minimal. The long-term effect, however, is cumulative and ruinous. A laser unibody auto frame straightener costs from \$9,000 - \$35,000; a computer-aided drafting and design system, \$15,000 - \$25,000; numerical controlled machine equipment, \$15,000 - \$50,000. For a school district to speak of five to ten million dollars worth of equipment is not unusual. Schools try valiantly to keep their equipment repaired and up-to-date but changing economic conditions make doing so a losing struggle. New solutions must be found.

The challenge occupational educators face with respect to equipment also confronts them on the vital matter of curriculum content. A major goal of curriculum revitalization is to develop a core of competencies that are essential for immediate employment, or going on to college, or for life-long learning up to the limit on one's potential. The overriding issue in curriculum revision is how to address the impact of new technologies on the

skill requirements of all industries and occupations -- not merely those labeled "high tech."

During 1984 the Council considered five questions: What should be taught? When should it be taught? Who should teach it? How should program content be evaluated? Who should make these decisions? These basic questions concerning occupational education curriculum development have been the same for 70 years, of course, and the Council has been addressing them periodically since 1969. The ever-increasing pace of economic and technological change precludes any final answers.

Our most recent discussions were given a note of urgency by the spate of reports on educational reform, in which occupational education was largely ignored. State legislatures nationwide hastily are enacting legislation to stiffen academic standards, without sufficient understanding of the impact of such changes on occupational education. In Massachusetts, vocational schools are having some difficulty adjusting to recently adopted minimum standards for admission to state colleges, and proposals are being offered to prescribe a minimum core curriculum for our schools. The Council along with other organizations in Massachusetts has urged deliberate consideration of such proposals, not because we are opposed to statewide educational standards, but because we fear that occupational education students might be trampled in the stampede for academic excellence. For example, a series of editorials in a major Boston newspaper advocated the elimination of business, home economics and industrial arts from any core curriculum because "these programs take valuable time away from academic subjects."

A second development that brought curriculum to the top of our agenda is the mandate in the new Carl D. Perkins Vocational Education Act (P.L. 98-524) for the establishment of "technical committees" to advise the State Council and the State Board on the development of model curricula to address state labor market needs. The law specifies that the technical committees are to compile an inventory of skills that a state can use to define up-to-date model curricula, and it is full of references to curriculum modernization, even in pre-vocational education and industrial arts programs.

A third reason for looking at curriculum has to do with the effects of Proposition 2-1/2, a tax reform measure passed by Massachusetts voters in 1980, which, in effect, limits the property taxes any city can assess to a maximum of 2-1/2 percent of current market value. This legislation has hit education hard.

Unfortunately, one of the cost-cutting measures adopted by some school systems has been to reduce or even eliminate the amount of time devoted to related instruction, especially math and science, that is directly related to the occupational area for which the student is training. In some cases, teachers have been assigned to teach related classes in occupational areas for which they are not certified or in which they have had limited practical experience. A few schools virtually have eliminated related instruction. These measures simply do not make sense to the Council. The importance of a related program should be unquestioned.

Since curriculum cannot be addressed separately from teachers and teaching, and since the demands of the workplace are growing steadily more complex, the Council has concluded that (1) it is essential for vocational teachers to have at least six years of recent full-time employment in their occupational fields; ("Recent" is defined as the six years immediately preceding entrance into the teaching profession.); (2) these same experienced instructors are the ones who should teach related subjects, ~~profession~~; and (3) the State should require at least 20-25 percent of curriculum time to be devoted to related subjects in any vocational program eligible for special state financial aid. These three interrelated recommendations are a package intended to be a partial response to the cry for more demanding vocational programs closely matched to the needs of Massachusetts' high technology sector.

V. COST-EFFECTIVENESS OF OCCUPATIONAL EDUCATION

Financing of occupational education combines resources from local, state and federal levels, with the heavier contributions coming from local and state sources. In fiscal year 1984, local/state sources accounted for 94% of all funds spent on occupational education in Massachusetts.

Local funds come primarily from real estate taxes which, increasingly, are constrained by the tax limiting measure passed by Massachusetts voters in 1980 -- Proposition 2 1/2. Local funds probably account for about 65% of the cost of occupational education.

State financial assistance is distributed under Chapter 70 of the Massachusetts General Laws, which is designed both to reduce the reliance on local property taxes in financing public schools and to equalize per pupil expenditures across the Commonwealth. A system of "pupil weights" is used, under which the State recognizes that some educational programs cost more than others. For example, a full time pupil in a regular day program is assigned a weight of 1.0; a pupil in a special education program could be assigned a weight of anywhere from 2.5 to 6.0, depending on the type of special education program; occupational education receives a pupil weighting of 2.0, provided that the program is approved by the Division of Occupational Education.

Federal financial assistance for occupational education is provided by Public Law 94-482, Title II, the Education Amendments of 1976. Funds are awarded on an annual basis in conjunction with a State Plan for Occupational Education, prepared by the Division of Occupational Education and submitted to the U.S. Education Department. The federal monies are allocated to the Division in two major categories: those for state programs and those for programs of national significance. The bulk of the money is in state programs. The federal law mandates several setasides for special populations (disadvantaged, handicapped, people having limited English proficiency). For the most part, these monies are matched with an equal amount of state and local funds.

The Division allocates federal funds by formula to public school districts, public community colleges and other eligible recipients. These funds are not considered an entitlement and awards are made on the basis of submitted applications.

Priority among eligible applicants is determined by their relative financial ability to provide resources, the number or concentration of low income families, unemployment rates and the level of economic depression.

Priority among eligible programs is determined by: the need for the program (including labor market demand, with preference given to programs new to the area and those designed to meet new and emerging employment needs); the quality of program design (including development of objectives, and plans for

evaluation, management and implementation); the degree of coordination for planning program development with other schools and training institutions; the extent of the program's impact on overcoming sex stereotyping in occupational education; and the degree of cost-effectiveness in the use of funds.

Priority among populations to be served is determined by federal, state and local policy, stressing access to occupational education and support services for the handicapped, disadvantaged, persons with limited English proficiency, minorities and persons in programs that are nontraditional for their sex.

In these times of fiscal austerity in the public sector, asking why occupational education often costs more than a regular high school education is a legitimate question. And given the high cost of occupational education, asking how one can assess cost-effectiveness also is legitimate. Two major factors contribute to higher costs:

1. Annual current costs and capital costs of instructional equipment, while varying greatly among programs, tend to be higher per student contact-hour. Several elements affect this factor:
 - o generally lower enrollments per course
 - o lower student-faculty ratio
 - o dual facilities -- related classroom space and laboratory and shop facilities
 - o greater maintenance requirements of equipment
 - o greater space requirements per student, due to equipment demands
 - o greater power costs related to equipment
2. The second major factor is that occupational education generally requires a greater number of student contact-hours than does general education. While credit requirements may be identical, occupational education students spend more time in shop and laboratory facilities than do general education students. The direct and indirect (support) costs associated with this factor account, in part, for added costs.
3. A third factor is the greater investment of the occupational education teacher in preparation, measured in terms of education and required experience in his/her occupational field, which translates into higher salaries to attract talented people.

As the competition for available funds intensifies, occupational education increasingly comes under pressure to justify its cost, relative to other programs. Critics ask a deceptively simple question: Since on the average, occupational education costs more per pupil than does academic or general education, shouldn't it yield greater benefits to its graduates? Traditionally, student employment success has been measured in terms of placement rates; i.e., the number of graduates who obtain employment in occupations related to their training.

Several problems are associated with the use of placement rates as the primary measure of success. First, many graduates find jobs only peripherally related to their skills-intensive training. Second, some graduates marry, or go into the military, or are unemployed for awhile before eventually ending up in jobs unrelated to their training. Most follow-up studies, however, take place within a year of graduation, so that these "delayed" placements would be missed. Third, wage rates should be as important as placement rates, even if a purely economic reward stance is adopted. Fourth, work attitudes may be the most significant positive outcome of occupational education at the secondary level. As one study observed:

. . . Vocational education is practiced in realistic settings in secondary school environments. Students use real equipment to create real products or services. It may be this realistic work environment, perceived as meaningful by students, that is the critical ingredient in vocational education programs. Such realistic learning environments may be essential in capturing the interest of the students. At the same time, they simulate industrial conditions in the real world in a way that facilitates easy transfer. Thus students feel at ease in the world of work, and the transition from school to work is less difficult. Such a theory should be advanced and studied, as it seems to account for the advantages in earnings of vocational graduates at the secondary level and represents a broadened basis for continued public investments in extra-cost high school vocational education.⁽⁹⁾

And fifth, while occupational education does have a positive long-term effect on the employment and wage experience of youth, the "education" component is at least as important as job-specific skills training. In the broadest sense, vocational education for youth has a three-fold mission: (1) to provide basic reading, writing and computation skills; (2) to provide basic educational, labor market and career information; and (3) to impart entry level job skills. Thus, youth participating in occupational education programs may continue in school, return to school, graduate to postsecondary skills training programs, go on to college, or enter the military -- all of which options are considered positive outcomes other than immediate placement in unsubsidized entry-level jobs.

Given the fact that occupational education is elective at the local level, two indices of success would be: (1) Are communities supporting it? and (2) Have enrollments (as a percentage of all enrollments) held up? The answer to both questions is "yes." For example, in 1973, state, local and federal spending on occupational education in Massachusetts totaled \$145,390,052, of which \$132,804,114, or 91%, was state and local money. In 1983, the total spent was \$252,410,058, of which \$237,095,864, or 94%, was state and local money.⁽¹⁰⁾

In 1979, total secondary enrollment (grades 9-12) in Massachusetts was 355,473. The total secondary enrollment in occupational education was 209,651, which means that 59% of all students enrolled at the secondary level were taking some kind of occupational education. By 1983 -- a period of declining enrollment -- total secondary enrollment was 300,559, and occupational education enrollment was 203,748, or 67%.⁽¹¹⁾

As an indicator of program success, one also might ask what employers think of occupational education graduates. A 1982 Massachusetts Employer Satisfaction Survey clearly indicates that employers and supervisors think the schools are effectively preparing students for employment. Of the 775 employers and supervisors throughout the Commonwealth who participated in the study, 80-90% rated former students' occupational training and/or job performance as "good" to "very good" in terms of technical knowledge, work attitude, work quality, overall training/performance, and relative preparation. The findings also indicate that supervisors tend to be almost as positive in rating the training or job preference of former students who are employed in jobs not related to their field of training (65-85% responding "good" or "very good").

Of the five aspects of occupational training and job performance examined, employers gave one -- work attitude -- a consistently high rating. This finding appears to support the notion that the vocational schools impart more than skills to their students; they provide them with an outlook and demeanor which is recognized and appreciated by employers and supervisors. The fact that supervisors were more positive in their ratings of work attitude than were the former students themselves, strengthens this interpretation.

In conclusion, it must be emphasized that occupational education is an integral part of the total educational system, and the basic academic skills it imparts are equally as important as job-specific training and orientation to work. Some of the particulars may differ, but occupational educators, no less than their academic colleagues, desire orderly classrooms, motivated students, supportive parents, up-to-date curricula, adequate financing and high professional standards. And occupational educators, no less than their academic colleagues, worry about the fact that the percentage of citizens with any school-age children continues to decrease, and want to make the kinds of improvements necessary to maintain public support of their schools.

Moreover, as the Massachusetts economy continues to evolve in the direction of services and high technology, it becomes increasingly obvious that anyone seeking a promising entry-level job must command basic reading, writing, computation and reasoning skills. The message from the Massachusetts business community is unambiguous: the needs of the labor market are changing and, in the future, occupational education must be more flexible and must devote increased attention to "academic" subjects.

Although there well may be some disagreement over what jobs are available and precisely what one needs to know in order to be employable, occupational educators always have been unanimous in their insistence on quality programs. This is so because occupational education graduates are evaluated according to very immediate and pragmatic criteria; e.g., Does this person show up, on time, ready to work? Does this person, in fact, possess the skills specified in his/her "certificate of competencies achieved?" Is this person familiar with the latest equipment in the field?

The reality is that quality occupational education can be expensive because it requires competent teachers current in their fields, state-of-the-art equipment, constantly revised curricula, rigorous performance standards, relatively small class size and relatively high operating costs. But the return on investment is impressive by any yardstick: better jobs and higher wages, higher productivity, improved competitive position, reduced poverty and welfare dependency, a better-educated citizenry, and a host of other returns, both economic and non-economic, to the Commonwealth.

VI. ONGOING ISSUES AND CONCERNS

The following summary of issues is derived from the Council's public meetings, from correspondence and conversations with educators, students, parents and employers, from research in connection with the report, An Assessment of Occupational Education in Massachusetts (November, 1984), and from Council members' own experiences. In some instances the evidence is inferred or anecdotal. In some instances reasonable people with good intent disagree on what has caused a problem and/or what to do about it. And in a few instances there even may be disagreement as to whether or not a problem really exists. But there can be no doubt that the value and effectiveness of this Council stem directly from bringing to the attention of the State Board of Education and other interested parties the unmet needs of occupational education in Massachusetts, as defined by both consumers and providers of occupational education. The Council's mission is a) to guarantee that citizens have a voice in the setting of policy for occupational education and b) to help define the issues; it is in that spirit that the following observations are offered.

A. THE STATE PLAN

Since 1968, the Council has been making the same general comments about the State Plan For Occupational Education:

- o it should provide for the assessment of present and future labor market needs;
- o it should present a comparison of current occupational education and job training programs, at all levels, with labor market needs;
- o it should detail all of the Commonwealth's present resources that might be used to meet labor market needs, and identify where the short falls are;
- o it should set forth priorities for occupational education and define occupational education's role in contributing to the Commonwealth's economic vitality;
- o it should describe a process for involving the private sector, as well as all relevant public agencies, in a comprehensive planning process at state and local levels;
- o it should contain measurable goals and objectives, along with a systematic procedure for evaluating progress toward goals; and
- o it should specify the particular needs of women, disadvantaged and minority populations, handicapped populations, and the incarcerated and suggest strategies for increasing the enrollment of these populations in programs that will give them the skills required to compete for jobs in primary labor markets.

Although there has been some improvement in the State Plan, it still falls short of being a readable, comprehensive document in which needs assessment is fully integrated with goals, activities and allocations of resources. In particular, the federal contribution, which is six percent of the total spent on occupational education and is focused on federal priorities, should be set forth clearly within a state policy framework that drives the other ninety-four percent. In the absence of a state policy framework, the State Plan will remain largely a compliance document. A recent report by the National Commission on Secondary Vocational Education put it this way:

As indicated earlier, accountability comes with federal support. The Congress must ensure that the dollars are focused on the national problems and federal priorities specified in the current act. This causes the use of funds to be circumscribed and focused. Such boundaries foster separation and hinder coordination and articulation with academic education and other employment and training systems.

State vocational educators, in too many cases, have relied excessively on federal regulations as a substitute for developing a comprehensive educational philosophy. The failure to exert strong leadership is reflected in inequitable opportunities for all students to pursue vocational education, and in policies and standards that are relevant but not necessary for quality vocational education.⁽¹²⁾

Under the new Carl D. Perkins Vocational Education Act (P.L. 98-524), the setaside provisions are even more prescriptive than before, and there is heavy emphasis on "linkages" among occupational education, employment training programs under the Job Training Partnership Act, and the private sector (including organized labor). More than ever before, local level providers of occupational education will need guidance and technical assistance in how to use their setaside funds creatively, how to improve programs, how to link up with the employment and training system, how to enhance cooperation with the private sector, and how to coordinate with state and local economic development projects.

The Council sees two major reasons for the inadequacy of state planning for occupational education. The first is that the Board of Education is grappling with many complex issues and simply does not have enough resources to give occupational education the attention it requires. The second reason is that the State law and regulations governing occupational education are out-of-date.

The Council long has believed that Chapter 74 of the Massachusetts General Laws, which determines which occupational education programs are eligible for State reimbursement, constricts the occupational education delivery system's capacity to respond to labor market and technological changes. Originally written in 1911 and amended many times, Chapter 74 is inadequate to meet today's occupational education needs.

Current and foreseeable trends suggest that it is time to reconsider such issues as: (1) the relationship between secondary and postsecondary programs; (2) the need to provide training in clusters of occupations, while emphasizing broad concepts, problem-solving, and transferable skills; and (3) expansion of employer-based work experience (for both teachers and students) as a critical component of occupational education. During 1984, the Council debated these issues and other related to the Commonwealth's need for skilled people.

In June, 1984 the Council disseminated a position paper (see Appendix B), in which we made seven recommendations specific to vocational education, as examples of the kinds of changes needed:

1. Retain the vocational/technical teacher approval requirement of six years of recent, full-time employment in the approved occupation. ("Recent" is defined as the six years immediately preceding entrance into the teaching profession.)
2. Revise curriculum time allotments at the vocational/technical secondary school level to:

At least 25% Academic Subjects
20-25% Related Subjects
40-50% Shop or Lab time

3. Related subjects should be taught only by those teachers who satisfy the requirements set forth in #1 above.
4. Institute a cluster-type program in all vocational/technical occupational areas.
5. Portions of State money and/or contributions from the private sector should be earmarked for new equipment.
6. State money should be earmarked for training approved teachers in the use of relevant instructional equipment. Such training can take place in a variety of ways; e.g., by vendors, in State Department of Education programs, or by industry at large.
7. Evaluation criteria for vocational/technical programs should provide credit for program graduates who go on to higher levels of education in any field, or who find employment in related fields.

In summary, the Council finds that State policy and law governing occupational education are out-of-date; that the State Plan for occupational education is a compliance document shaped almost entirely by federal priorities and regulations; that the delivery system for occupational education and employment training is fragmented, with various segments competing for funds

and students; and that the State Board of Education does not regard occupational education to be equally as important as academic education. This is not to say that Massachusetts offers inferior programs, for we believe that the Commonwealth still has one of the best delivery systems in the nation. But the Massachusetts economy is highly dependent on human resource development to remain competitive in world and domestic markets. What was good in the past can become obsolete quickly in today's economic climate.

Accordingly, the Council makes the following recommendations:

1. THAT THE GOVERNOR, IN CONSULTATION WITH THE BOARD OF EDUCATION AND THE BOARD OF REGENTS, SHOULD APPOINT A SPECIAL COMMISSION TO EVALUATE STATE POLICY, LAW AND REGULATIONS PERTAINING TO OCCUPATIONAL EDUCATION AND MAKE RECOMMENDATIONS.
2. THAT A JOINT COMMITTEE ON OCCUPATIONAL EDUCATION AND EMPLOYMENT TRAINING BE FORMED, WITH MEMBERS REPRESENTING THE BOARD OF EDUCATION, THE BOARD OF REGENTS, THE OFFICE OF ECONOMIC AFFAIRS, AND APPROPRIATE SEGMENTS OF THE GENERAL PUBLIC.
 - a. The responsibilities of such a committee should include:
 - o Recommending policy for the delivery of occupational education and employment training programs;
 - o Recommending a comprehensive statewide plan setting forth goals and planned use of federal and state funds;
 - o Evaluating programs; and
 - o Ensuring coordination and nonduplication among agencies responsible for delivering occupational education and employment training programs.

B. THE ACCOUNTABILITY REPORT

The Council was consulted in the development of the FY 1983 Accountability Report for occupational education, as required by P.L. 94-482, section 108. Our analysis of quantitative data indicates that the State is complying with federal law and regulations (see Appendix A).

During 1984 Council members and staff participated as observers in a small sample of program audits conducted by the Division of Occupational Education. The newly developed Program Improvement Evaluation Questionnaire was used. As a process, it is helpful in identifying strengths and weakness. The Council has two observations. The first is that we are not sure the "generalist" approach to staffing regional offices works, especially when program evaluation is involved. The Council continues to hear complaints about the lack of technical expertise in program areas, which is reflected

both in the quality of technical assistance available and the quality of evaluation. It is time for the Board of Education to re-examine this policy.

A second concern has to do with the use of evaluation results. The Accountability Report does not say how evaluation information was used to improve occupational education statewide, or how such information was used to re-assess current State occupational education policy. There is no clear, narrative statement of what was planned, what was achieved, and what changes are needed.

C. COORDINATION OF OCCUPATIONAL EDUCATION WITH TRAINING PROGRAMS UNDER JTPA

The Council reviewed the Massachusetts Governor's Coordination and Special Plan For The Job Training Partnership Act (JTPA), dated May 15, 1984, covering program years 1984 and 1985, and found it to be exemplary. There has been increased coordination in the Commonwealth between the occupational education and the JTPA delivery systems, especially at the state-agency level.

In January, 1984 the Massachusetts Executive Office of Economic Affairs and the Department of Education requested proposals from Private Industry Councils for education and training services under the JTPA eight percent coordination grant. These services were to be focused on disadvantaged youth (aged 14-21), high school dropouts and AFDC recipients. The request for proposals requires that Private Industry Councils applying for grants establish a comprehensive education/employment planning process, which is to involve representatives of the employment and training system, educational institutions and the business community. These programs are to be completed by June 30, 1985.

In each of the Massachusetts Department of Education regions a staff person has been hired to work with the JTPA system and there are projects involving school-to-work programs in thirty communities serving 1,900 students. While it is too soon to judge the long term success of these cooperative agreements, it is apparent that the results thus far are uneven across the State. Some partnerships between Private Industry Councils (PICs) and vocational schools are productive; others are little more than a continuation under JTPA of the same programs and infrastructure that existed under CETA.

D. FUNDING

In Chapters IV and V of this Report, the Council speaks to the issue of the cost of occupational education. We stress that occupational education often costs more than strictly academic programs do, for a variety of reasons, including:

- acquisition, maintenance and operating costs of equipment

- greater number of student contact-hours
- higher salaries needed to attract qualified instructors, especially in technical fields such as electronics
- lower student-faculty ratio
- dual facilities: shop and classroom space

Massachusetts built an outstanding occupational education system on the premise that the best way to finance this greater-than-average cost was through a partnership between state and local sources, with both contributing fifty percent. However, the 50/50 partnership concept was abandoned by the legislature in 1978, and in 1980 the Massachusetts voters passed the tax limiting measure known as Proposition 2-1/2. The combined effect has been to erode the capacity of local educational agencies to offer competitive salaries, to keep up-to-date in equipment, and to offer new programs to meet the needs of technology-intensive industries.

Various proposals for increasing State aid to schools are, or shortly will be, before the State Legislature. Any valid proposal to restructure the way public education is financed in Massachusetts must encompass equity, excellence, diversity and local autonomy, and the Council is wise enough to avoid even the suggestion that it knows of any simple way to do that. But the Council supports the goals of raising State education aid to the national average of fifty percent and distributing such aid in a manner calculated to equalize per-pupil spending in the Commonwealth. We also believe that State education aid should be protected from diversion at the local level, to uses other than education.

Beyond these general goals, however, the Council believes that any increased state aid to education should be allocated in a manner that is fair to occupational education. As discussed in Chapter V, quality occupational education is expensive, because it requires competent teachers current in their fields, relevant instructional equipment, constantly revised curricula, rigorous performance standards, relatively small class size and relatively high operating costs. But the return on investment is impressive by any yardstick: better jobs and higher wages, higher productivity, improved competitive position, reduced poverty and welfare dependency, a better-educated citizenry, and a host of other returns, both economic and non-economic.

Consideration also should be given to some form of categorical aid, based on incentives to keep occupational education current with labor market demand.

Consideration also should be given to a line item appropriation in the State budget for replacing and upgrading vocational equipment, to be made available to school districts on a dollar-for-dollar matching basis.

Since there has been a beginning to business-school partnership, this effort should be increased to provide relevant instructional equipment and software. This will require a considerable additional investment of time, effort, money and dialogue, from both business and education.

E. STANDARDS IN OCCUPATIONAL EDUCATION

Traditionally, occupational education has prided itself on preparing students for the world of work and a lifetime of steady improvement of skills, with commensurate financial reward. Some feel, however, that while occupational education has produced graduates with excellent entry level job skills, too often these graduates are deficient in the basic cognitive skills demanded by today's labor market. Numerous studies show that young people are graduating from high school without having learned how to learn, i.e., without having mastered a body of "fundamental knowledge, concepts and skills that create an intellectual framework to which new knowledge can be added." (13)

The continuing influence on the American economy of computer and communications technologies is exerting strong pressure on occupational education to develop a more comprehensive instructional model, with greater emphasis on reading, science, math, oral and written expression, and problem solving. Central to the debate on curriculum revitalization is the idea of a "core of competencies" that are essential not only for either immediate employment or going on to college, but also for adaptability and life-long learning up to the limit of one's potential. (14) Occupational educators are designing new curricula which go beyond traditional, job-specific competencies to include higher levels of academic competencies, with greater emphasis on the general principles underlying a specific occupational field.

A good example of this more comprehensive approach to curriculum is the Principles of Technology Project (a consortium of states in which Massachusetts is participating), formed for the purposes of developing and field-testing a plan of instruction at grades eleven and twelve with broad-based concepts and principles of technology. The Commonwealth also has instituted the Massachusetts Vocational Curriculum Resource Center (MVCRC), the major function of which is to collect up-to-date occupational education curriculum resources and to disseminate these resources to teachers. The MVCRC offers technical assistance and inservice training to occupational education teachers in the use of its resources, for designing new programs or updating existing ones. In addition, a new emphasis in Massachusetts on competency-based curriculum development shows great promise for increasing joint planning between employers and occupational education, to identify up-to-date performance objectives. Such an approach has the advantage of permitting students to progress at their own, individual paces, while providing potential employers with an unambiguous record of the skills mastered by any particular student.

A recurring theme from the Council's public hearings is the complaint from parents that occupational education programs do not demand enough from students in their academic classes. Deficiencies in the basic academic skills component of occupational education produce high school graduates ill-prepared for postsecondary training -- or for a four year college program should they decide they want it. We should be in the business of expanding students' career options, not limiting them.

An occupational education program should include hands-on skill training, academic preparation, theory and practice related to the occupation, and on-site work experience. The occupational education graduate should be no less well-prepared in basic academic competencies than is the college-bound graduate. Standards for employment-related competencies should be set with maximum involvement of business and industry.

In light of the above, the Council recommends:

THAT THE STATE BOARD OF EDUCATION BE GIVEN THE AUTHORITY TO ESTABLISH MINIMUM COMPETENCY STANDARDS FOR GRADUATES OF OCCUPATIONAL EDUCATION PROGRAMS, INCLUDING APPROPRIATE ACADEMIC AND RELATED THEORY COMPETENCIES.

F. TEACHER SHORTAGES

As noted in Chapter III, there is a general shortage of qualified instructors in most technology-related fields, at both secondary and postsecondary levels, because schools simply cannot match the salary and benefits package offered by private sector employers. The result is either a reduction in program quality, or an inability to offer certain programs essential to the Commonwealth's economic vitality.

In addition to the problem of recruiting and retaining instructors experienced in their occupational areas, however, there is the matter of teacher preparation. Requiring college degrees as a way to guarantee adequate pedagogical training is a tempting idea, but, unfortunately, a college degree does not ensure pedagogical excellence either for academic or occupational education teachers. The quality of teacher preparation varies considerably within the State. But more importantly, emphasizing higher education degrees and recent, continuous, full-time employment either discourages people with expertise in their occupations from entering teaching, or tempts them to enroll in quick and easy degree programs of dubious value.

In light of the above, the Council recommends:

THAT THE STATE ESTABLISH AND FUND A "CENTER FOR TEACHER-TRAINING EXCELLENCE," WITH A MANDATE TO RESTRUCTURE THE SYSTEM OF OCCUPATIONAL EDUCATION TEACHER-TRAINING AND TO AGGRESSIVELY RECRUIT TEACHERS FOR ALL CAREER CLUSTERS REPRESENTED IN THE WORKFORCE.

- a. One of the highest priorities for such an agency should be to persuade the state colleges and universities to accept occupational education as an integral part of higher education's mission, rather than an ancillary activity characterized by short-term planning and rigid boundaries.

- b. Teacher-training programs, both preservice and inservice, need to do a better job of training occupational education teachers in how to help improve their secondary students' basic skills (reading, writing, math, oral communication.)

G. STATUS OF RECOMMENDATIONS CONTAINED IN THE COUNCIL'S 1983 ANNUAL REPORT

COUNCIL'S RECOMMENDATION

1. THAT THE MASSACHUSETTS ADVISORY COUNCIL ON VOCATIONAL-TECHNICAL EDUCATION AND THE DIVISION OF OCCUPATIONAL EDUCATION JOINTLY CONDUCT A STATE-OF-THE PRACTICE STUDY OF THE VOCATIONAL EDUCATION DELIVERY SYSTEM IN MASSACHUSETTS.

BOARD'S RESPONSE

This recommendation, as noted in your Annual Report, is presently being addressed. The result of The State-of-the Practice Report will be included in the Council's 1984 Annual Report.

RECOMMENDATION

2. THAT THE STATE BOARD OF EDUCATION UNDERTAKE AN INTERNAL REVIEW OF ALL STATE POLICY, LEGISLATION AND REGULATIONS WHICH BEAR ON STATE PURPOSES FOR OCCUPATIONAL EDUCATION, TOWARD THE END OF EVENTUALLY ESTABLISHING A COMPREHENSIVE STATE POLICY FOR EDUCATION, TRAINING AND EMPLOYMENT.

RESPONSE

The Department of Education completed a revision of the regulations, commonly known as "Bulletin 326" which govern state-aided vocational education under G.L. Chapter 74. "Bulletin 326" had not been revised since 1951. These revised regulations are now entitled "Regulations Governing Vocational Education under G.L. Chapter 74" and became effective on September 1, 1977.

In March, 1978, the Department of Education filed legislation to further clarify certain definitions under the State's Vocational Education Law, Chapter 74. The revised regulations clarify the statutory definitions in ways that reflect the Board's policy to support new and emerging occupations, and eliminate those provisions relating to the sex of pupils, that were inconsistent with current laws.

The Division of Occupational Education established an internal committee of regional and central office occupational education staff to review Chapter 74 regulations and relevant continuing and emerg-

ing issues which may impact upon these regulations. Committee efforts will continue through the summer of '84 and the Committee expects to present its findings and recommendations to the Associate Commissioner by September, 1984.

Also, see the first two paragraphs of the Board's response to Recommendation 3 below.

RECOMMENDATION

3. THAT THE DIVISION OF OCCUPATIONAL EDUCATION AND THE DEPARTMENT OF MANPOWER DEVELOPMENT JOINTLY PRODUCE AND PLAN TO ADDRESS THE FOLLOWING (MINIMUM NUMBER OF) TOPICS:
 - A. Ways in which vocational schools can achieve closer ties with organizations having economic development objectives:
 - B. Ways in which vocational schools can respond more quickly to changes in labor market needs in Massachusetts and New England;
 - C. Ways in which vocational schools, administrators and service deliverers can tailor programs to specific employer and student needs; and
 - D. Ways in which state level agencies can provide local level service deliverers improved knowledge and technical assistance regarding economic development strategies.

RESPONSE

- A. The link between education and employment is a critical element in the State's economic development. As an expression of its concern that schools adequately prepare youth for employment, the State Board created a Task Force on Public School Youth, Education and Employment in October of 1982 to advise the State Board, local schools, state agencies and the public on ways to improve programs which prepare young people for employment.

In December, 1983, the State Board received and approved, with commendation, the Report of the Task Force. Over the next six months, the Department will be preparing a comprehensive Youth Education for Employment Policy that incorporates the recommendations of the Task Force on Public School Youth, Education and Employment.

- B. The Division of Occupational Education is working with the Division of Employment Security to develop a publication on local labor market needs, industry growth and decline, and supply of labor from training programs for each of fifteen (15)

substate areas of the Commonwealth. These booklets will be distributed at a training session for vocational school administrators which will be a joint presentation by staff of both Divisions at the June, 1984 Professional Improvement Conference.

- C. The Division has sponsored a total of four days of training (March and May, 1984) on the subject of improvement of academic curricula for technology training programs. This training program was organized in collaboration with the Massachusetts Association of Vocational Administrators and the Massachusetts Vocational Curriculum Resource Center and over 220 vocational school teachers, coordinators, and administrators participated in the two conferences.

The Division will continue to support the development and implementation of a stronger technology based core curriculum to complement specific subject skills training as a way to enhance the advancement as well as employability of vocational students.

The Division will continue to support the dissemination of information about programs which provide training tailored to specific employer and student needs. The Massachusetts Vocational Curriculum Resource Center is the centerpiece of this activity.

RECOMMENDATION

4. THAT THE DIVISION OF OCCUPATIONAL EDUCATION AND THE DEPARTMENT OF MANPOWER DEVELOPMENT JOINTLY UNDERTAKE A STUDY TO ASSESS THE DEGREE TO WHICH THE QUALITY AND AVAILABILITY OF VOCATIONAL EDUCATION AND OTHER EMPLOYMENT AND TRAINING PROGRAMS ARE FACTORS IN THE STARTING OR EXPANSION OF BUSINESS IN MASSACHUSETTS.

RESPONSE

The "1982 Massachusetts Employers/Satisfaction Survey" was conducted between April of 1982 and January of 1983. This ten-month study was undertaken "to determine the level of employers' satisfaction with the skills of vocational education graduates in Massachusetts. From the data collected from 43 selective vocational secondary schools throughout the Commonwealth, over 7,300 former students from the Class of 1979 and 1980 were identified and contacted. Data were collected from approximately 1,550 former students and 800 of their employers/supervisors regarding several aspects of the former student's vocational training and/or job performance. The major findings of the study are:

- o Of the 775 employers and supervisors throughout the Commonwealth who participated in the study, 80-90% rated former students' vocational training and/or job performance as "good" to "very good" in terms of Technical Knowledge, Work Attitude, Work Quality, Overall Training/Performance, and Relative Preparation. The findings also indicate that supervisors tend to be almost as positive in rating the training or job performance of former students who are employed in jobs which are not related to their field of training. Of the five aspects of occupational training and job performance examined -- employers gave one a consistently high rating -- Work Attitude. This finding appears to support the notion that the vocational schools impart more than skills to their students, they provide them with an outlook and demeanor which is recognized and appreciated by employers and supervisors.
- o Analysis of the survey data reveals that 80% of the employers rated former vocational school students as "better prepared" than co-workers in similar positions. In a time of technical transition and economic adjustment, this finding should be particularly reassuring to vocational educators who often lack the capital equipment and financial resources to keep abreast of short-term shifts in the job market. This finding appears to provide the students with standards and attitudes which are both beneficial and transferable to other areas of employment.
- o In summary, the 1982 Massachusetts Employer Satisfaction Study has found that both employers, supervisors and former students of the state's vocational secondary schools have given them high marks in terms of occupational training and job performance of their graduates.

RECOMMENDATION

5. THAT THE DIVISION OF OCCUPATIONAL EDUCATION COMPILE AND DISSEMINATE A PROGRESS REPORT ON ACTIONS TAKEN BY THE BOSTON SCHOOL DEPARTMENT, AS OF DECEMBER 31, 1982, TO ADDRESS THE FINDINGS CONTAINED IN (A) AN EVALUATION OF OCCUPATIONAL EDUCATION IN THE BOSTON PUBLIC SCHOOLS, JANUARY 31, 1981; (B) AN EVALUATION OF OCCUPATIONAL EDUCATION PROGRAMS AT THE HUBERT H. HUMPHREY OCCUPATIONAL RESOURCE CENTER, AUGUST, 1982; AND (C) AUDITOR'S REPORT 035--BOSTON PUBLIC SCHOOLS, JUNE 15, 1981.

RESPONSE

In its December 23, 1982 Memorandum and Orders of Disengagement, the Federal District Court ordered the Massachusetts Board of Education to take certain responsibilities for the ongoing resolution of the Boston School Desegregation Case for a minimum period

of two (2) years. Vocational and Occupational Education are key components to the case. The Court has identified a listing of 12 outstanding orders which the Department of Education must monitor. Vocational/Occupational Education is one of those orders.

The Division of Occupational Education has monitored several areas with respect to Vocational/Occupational Education in the Boston School Department. The State Board has submitted comprehensive reports to the Court on the following dates: June 28, 1983 and January 14, 1984. A third report will be submitted to the Court on June 26, 1984. These reports are available for review.

The Division feels its primary responsibility is to monitor and report on implementation of the Court's desegregation order, and that, in the process, the evaluation and the audit findings are also addressed.

The Division agrees with the Council that if the recommendations contained in the audits were fully implemented, vocational education in Boston, indeed, would be improved.

RECOMMENDATION

6. THAT THE DIVISION OF OCCUPATIONAL EDUCATION DEVELOP AND DISSEMINATE A POSITION WITH RESPECT TO THE FOLLOWING ISSUES:
 - A. Is vocational (job specific) preparation best carried out on the secondary or postsecondary level or by some mixture of the two? Why?
 - B. Would offering all vocational exploratory programs at the 9th and 10th grade levels in local high schools and intensive skills training programs at the 11th and 12th grade levels in regional vocational schools better meet students' needs and make for a more cost-effective delivery system? Why or why not?
 - C. (How) can industrial arts and other occupational education programs offered in comprehensive high schools be restructured to make them more skills intensive?
 - D. Should industrial arts receive federal funding under P.L. 94-482? Why or why not?
 - E. Should the present definition of what constitutes vocational education under Massachusetts General Laws Chapter 74 be broadened? Why or why not?

- F. How might current state laws and regulations regarding approved vocational programs and required subjects be modified in order to guarantee full access by all students to vocational offerings in comprehensive high schools?
- G. How can true articulation and cooperation between occupational and vocational programs and between occupational/vocational programs and the general education community best be effected?

RESPONSE

While limited staffing prevents the Division from assigning staff to the development of positions with respect to each of these issues, the Division will consider the establishment of a special committee, made up of representatives from various organizations and communities, to discuss the listed issues and other pressing concerns that impact the scope and quality of vocational education.

SUMMARY

Overall, the Council was less than satisfied with the responses to its 1983 recommendations; some of those responses were oblique, others did not speak to the recommendations at all. This is not, by any means, the first time the Council has been dissatisfied with the nature of the responses it has received, witness the fact that four of the six recommendations made in 1983 were repeated from our previous Annual Report. In order to address this ongoing problem, the Council chair and staff met with the chair of the Board of Education who, as always, was enthusiastic at the opportunity to engage in a dialogue. At his suggestion we have reformulated two of last year's recommendations, which appear as recommendation #7 and #8 in the Executive Summary.

FOOTNOTES

- (1) Boston Globe, March 25, 1984, p. 1.
- (2) "The 15th Annual Gallop Poll of the Public's Attitudes Toward the Public Schools," Phi Delta Kappan, September, 1983, p. 41.
- (3) McCaslin, N. L., "Outcomes associated with participation in secondary vocational education," National Center for Research in Vocational Education, April, 1984.
- (4) TDR Associates, Inc., Massachusetts Employers' Satisfaction Survey, 1983.
- (5) M.G.L. Chapter 74, Section 1.
- (6) Commonwealth of Massachusetts Annual Accountability Report For Vocational Education For Fiscal Year 1983, June, 1984, p. 31.
- (7) Ibid., p. 28.
- (8) Council of Vocational Educators, "Position Paper On Staff and Equipment Needs in Vocational-Technical Programs," May 27, 1983.
- (9) William G. Conroy, Jr., "Some Historical Effect of Vocational Education at the Secondary Level," Phi Delta Kappan, December, 1979, p. 270.
- (10) Sources: Massachusetts Department of Education, Facts About Education In Massachusetts: 1978-1979, p. 36; Commonwealth of Massachusetts, Annual Accountability Report For Vocational Education For Fiscal Year 1983, pp 15, 28; Massachusetts Department of Education, Individual School Report, October 1, 1983, Table 1, p. 8; Massachusetts Advisory Council On Vocational-Technical Education, Annual Report 1978, p. 32.
- (11) Ibid.
- (12) National Commission on Secondary Vocational Education, The Unfinished Agenda, National Center for Research in Vocational Education, the Ohio State University, Columbus, Ohio, 1984, p. 19.
- (13) National Academy of Sciences, High Schools and the Changing Workplace: The Employers' View, National Academy Press, 1984, p. 17.
- (14) Ibid., p. 19.

APPENDIX A

DATA

TABLE 1

Fiscal Year 1983

Overall Statewide Enrollments in Occupational Programs
By Major Program Area and Level

Program	School Districts		Community Colleges	Total
	Secondary	Postsecondary/ Adult	Postsecondary/ Adult	
Agriculture	1,797	1,487	93	3,377
Distributive Education	4,777	97	1,374	6,248
Health Occupations	2,308	1,223	4,275	7,806
Consumer and Homemaking (Occ. Prep. & Not Occ. Prep.)	2,802	2,608	887	6,297
Office Occupations	92,133	1,945	16,259	110,337
Technical Occupations	3,006	2,345	7,107	12,458
Trade and Industrial	<u>39,191</u>	<u>612</u>	<u>701</u>	<u>40,504</u>
Totals	<u>146,014</u>	<u>10,317</u>	<u>30,696</u>	<u>187,027</u>
Industrial Arts				
Grades 7 and 8			57,192	
Secondary			<u>57,734</u>	
Total Industrial Arts				114,926
Consumer and Homemaking (Not Occupational)				<u>54,467</u>
Grades 7 and 8				
TOTAL STATEWIDE ENROLLMENTS				<u>356,420</u>

Source: Commonwealth of Massachusetts, Annual Accountability Report
For Vocational Education For Fiscal Year 1983, p.28.

TABLE 2
INSTRUCTIONAL PROGRAM CATEGORIES
FY 1983

AGRICULTURE

Agricultural Production
Animal Science
Arboriculture
Floriculture
Forestry
Landscaping
Mechanics
Ornamental Horticulture
Other
Plant Science
Poultry Science
Supplies and Services

DISTRIBUTIVE

Apparel and Accessories
Finance and Credit
Food Services
General Merchandise
Hotel and Lodging

HEALTH

Dental Assistant
Dietary Aide
Health Aide
Medical Assistant
Medical Laboratory Technician
Nursing Assistant (Aide)
Other
Physical Therapy
Radiologic Technician

OCCUPATIONAL PREPARATION HOME ECONOMICS

Care and Guidance of Children
Clothing Management, Production and Service
Food Management, Production and Services
Institutional and Home Management and Support Service
Other Occupational Preparation-Homemaking

OFFICE

Accounting and Comptrol
Business Data Processing System
Filing, Office Machines
Materials Support, Trans., etc.
Stenography, Secretarial and Related
Typing and Related

TABLE 2 (Continued)

TECHNICAL

Business Technology
Chemical Technology
Communications Technology
Data Entry/Retrieval
Electro Mechanical Technology
Electronics Technology
Packaging Technology
Programming
Scientific Data Technology

TRADE AND INDUSTRY

Air Conditioning
Appliance Repair
Auto Mechanics
Body and Fender Repair
Carpentry
Commercial Art Occupations
Commercial Photography
Cook/Chef
Cosmetology
Custodial Services
Diesel Mechanics
Electrical Occupations
Electronics Occupations
Electricity
Graphic Arts Occupations
Heavy Equipment Operation and Maintenance
Industrial Sewing Machine Repair
Instrument Maintenance and Repair
Machine Shop
Maritime Operations
Masonry
Metal Patternmaking
Metalworking Occupations
Other
Painting and Decorating
Plastics Occupations
Printing Press Occupations
Quantity Food Occupations
Radio and T.V. Production
Radio and T.V. Repairs
Sheet Metal
Small Engine Repair
Stationary Energy Sources
Textile Production and Frabrication
Upholstering
Woodworking/Cabinetmaking

Source: Massachusetts Department of Education, Division of
Occupational Education

TABLE 3

Massachusetts 1981-82 School Year
Distribution of Occupational Education Students in Comprehensive and Vocational High School
by Sex and Racial/Ethnic Group, and by Program Area

Program Area	Total	Amer. Indian/ Alaskan Native		Asian American/ Pacific Islander		Black, Not Hispanic		Hispanic		White Not Hispanic	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Agriculture	1,751	1	2	1	3	30	34	11	11	1,093	565
Distribution	5,517	2	7	10	21	153	242	49	90	1,699	3,244
Health	2,429	-	7	2	22	42	158	32	112	152	1,902
Occ. Home Economics	3,963	1	3	3	7	29	106	66	146	999	2,603
Technical	2,174	4	-	6	2	53	10	20	55	1,092	932
Trade and Industrial	41,476	79	29	164	171	1,575	590	961	296	30,777	6,834
Office	95,432	36	598	263	339	1,912	3,485	704	1,858	24,480	61,757
Home Economics	86,324	70	50	214	395	2,220	2,918	1,089	1,528	25,030	52,810
Industrial Arts	117,389	67	45	571	275	3,704	2,236	2,303	1,051	80,364	26,773
Other	4,666	4	4	41	64	284	280	88	82	2,028	1,791
TOTAL	361,121	264	745	1,275	1,299	10,002	10,059	5,323	5,229	67,714	159,211

Source: Massachusetts Division of Occupational Education

Note: Home Economics and Industrial Arts include Grades 7 & 8

TABLE 4

Fiscal Year 1983

Priority Populations Served in Chapter 74 Secondary Programs
(by Major Program Area)

USOE Code and Title	Male Enrollment				Female Enrollment				Total Enrollment		
	Total	Minority	Disadvantaged	Handicapped	Total	Minority	Disadvantaged	Handicapped	First Language		Limited English Proficient
									Not English	English	
010000 Agriculture	1,037	41	142	201	567	52	81	40	23		
040000 Distributive Education	1,420	287	385	250	2,393	345	553	239	131		56
070000 Health	133	16	22	28	1,884	236	283	166	125		188
090200 Consumer and Homemaking	283	20	54	88	1,752	267	345	249	140		31
160000 Technical	862	38	91	82	979	21	114	47	66		34
170000 Trade and Industrial	28,473	2,443	5,476	4,754	6,993	929	1,310	690	1,416		391
TOTALS	32,208	2,845	6,170	5,403	14,568	1,850	2,686	1,441	1,901		700

APPENDIX B

COUNCIL POSITION PAPER

Massachusetts Advisory Council
on
Vocational - Technical Education

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JUNE, 1984

PLANNING FOR MASSACHUSETTS' TRAINED LABOR NEEDS,
ESPECIALLY THOSE OF INDUSTRIES MOST AFFECTED BY NEW TECHNOLOGIES

Most economic development strategies for Massachusetts stress the need to provide the skilled work force required by the State's high technology sector. However, when investigating how best to involve vocational-technical education in meeting this need, the Massachusetts Advisory Council on Vocational-Technical Education (the Council) finds no consensus about what high technology industries are, or about which occupations are high technology occupations. After considerable discussion, the Council has settled on the following definitions as adequate for this report:*

- 1) High technology is knowledge intensive - it employs a higher proportion of skilled workers (scientists, engineers and technicians) than does the overall manufacturing sector;
- 2) high technology firms produce high value-added products;
- 3) high technology firms have high growth rates and high ratios of research and development expenditures to sales.
- 4) high technology occupations are those jobs that create, run, use, maintain and repair new technological products.

Attachment A to this report compares industries labeled "high technology," as defined by the Division of Employment Security (DES) and the Department of Manpower Development (DMD). The category "engines and turbines," for example, is classified as a high tech industry by DMD but not by DES. But assuming that "engines and turbines" is indeed a high tech industry, a logical next step would be to contact Massachusetts firms falling in this category and to inquire of them what occupational skills they require. At the very least, we would find that this industry employs machinists, metal fabricators, electrical and electronics technicians, assemblers, mechanical and electrical drafters, and computer operators, repairers and programmers.

If the Commonwealth's vocational-technical education delivery system offers courses in these occupational areas, can it be concluded that the needs of this high tech industry are being met?

* The Council wishes to thank Ms. Joanne Yphantis, Executive Director of the Massachusetts Occupational Information Coordinating Committee, for her assistance with these definitions, and for providing a list of high tech industries.

The answer is partially "yes" and partially "no." For if valid skills data were available, we would see that computer-aided machining, welding and drafting would be considered essential to the education process for machinists, welders and drafters. However, these new skills generally are not included to any useful degree within these various occupational curricula.

Any plan to address the State's high tech labor needs should include a statement urging that Computer-Aided Drafting and Computer-Aided Manufacturing be included in all vocational-technical high school drafting, machining and metal fabrication programs, and that all electrical-electronic courses be updated to include the rapidly changing "state of the art" skills that exist in these fields. Printed circuitry and integrated circuits relative to computers should be considered most important in the development of young electrical and electronic technicians.

The larger issue, however, is not "high tech" per se, which planners now realize will create only a small percentage of the employment opportunities needed for a robust economy, but rather the impact of new technologies on the skill requirements of all industries and occupations. The high tech industries themselves will not generate enough new jobs to assure economic growth, compared to companies that use advanced technology, especially the service industries. The demands placed on vocational-technical education by the rapid pace of technological change in every field are multiple and interrelated. While the precise nature of the future world of work is still largely unknown, it is a certainty that vocational-technical education must provide students with both a strong basic education and transferable skills.

The Council believes that the teacher is the most important component of any educational delivery system, including vocational-technical education. Local education agencies must be responsible for the training of their teachers in the use of the new tools and systems now coming into use within most occupational areas. Generally speaking, a secure teacher is an effective teacher.

In addition, curricula must be revised to include a clustering concept, whereby a student majoring in a particular occupation is, to a supportive degree, involved in those occupations closely akin to his or her own occupation. This concept will result in increased motivation, broader employment opportunities and a more in-depth understanding of the relationship of his or her occupation to others within the product-producing system.

Also included in any plan to address the State's labor needs must be realistic criteria for measuring the effectiveness of any vocational-technical program. In developing such criteria certainly two important measures would be: (1) placement in an occupational area relevant to the training received, and (2) the degree to which employers consider vocational-technical education completers to be well-trained. The Council has no argument with these two measurements of program success. However, our experience tells us that these criteria are limited to two, simplified conditions that only touch the surface of understanding adolescent values.

When a student embarks on a vocational educational program, he or she is fourteen years old. Fourteen is a very young age for intelligent decision-making. Students do change their minds and there is nothing wrong with this. The quality of graduate's life is the real criterion of how good the individual's educational experience was. The pursuit of higher or different educational goals after graduation should be considered an affirmation of the educational process preceeding that choice.

In recent years, there has been a tendency to withhold needed funds from the public educational sector. This is being done because of dissatisfaction with academic achievement within the public schools. Although there has been no great dissatisfaction with the vocational-technical sector, it has suffered along with its academic counterpart. In some areas, related theory and related mathematics have been reduced. The school day has been shortened. To some degree, the entire structure has been demoralized. When vocational educators should be responding to all the technical changes occurring in industry, they find themselves being ignored by the educational establishment, who seem more concerned with classifying teachers than with educating young Americans to better compete in a very tough world market.

In summary, the Council recommends the following steps in order to plan for the State's trained labor needs, especially those of industries most affected by the pace of technological change.

1. Retain the vocational-technical teacher approval requirement of six years of recent, full-time employment in the approved occupation. (attachment 1)
2. Revise curriculum time allotments at the vocational-technical secondary school level to:

At least 25% Academic Subjects
20-25% Related Subjects
40-50% Shop or Lab time
3. Related subjects should be taught only by those teachers who satisfy the requirements set forth in #1 (attachment 3).
4. Institute a cluster-type program in all vocational-technical occupational areas (attachment 4).
5. Portions of State money and/or contributions from the private sector should be earmarked for new equipment (attachment 4).
6. State money should be earmarked for training approved teachers in the use of relevant instructional equipment. Such training can take place in a variety of ways; e.g., by vendors, in State Department of Education programs, or by industry at large (attachment 6).
7. Evaluation criteria for vocational-technical programs should provide credit for program graduates who go on to higher levels of education in any field, or who find employment in realted fields (attachment 7)

Comparison of
Definitions of High Technology

Industries labeled "High Technology" - as defined by Division of Employment Security (DES) and Department of Manpower Development (DMD).

Standard Industrial Classifications (SIC)		Industry Title
DES	DMD	
	281	Industrial Chemicals
	282	Plastic Materials
293	283	Drugs
348		Ordnance and Accesories, IIEC
	351	Engines and Turbines
357	357	Office and Computing Machines
36		Electrical and Electronic Machinery, Equipment and Supplies
361	361	Electrical Distribution
362	362	Electrical Industrial Apparatus
363		Household Appliances
364		Electrical Lighting and Wiring
365		Radio and TV Receiving Equipment
366	366	Communications Equipment
367	367	Electronic Components and Accessories
369		Misc. Electrical Equipment and Supplies
	372	Aircraft and Parts
376	376	Guided Missiles and Space Vehicles
379		Misc. Transportation Equipment
38		Measuring, Analyzing, and Controlling Instruments; Photographic, Medical, and Optical Goods; Watches and Clocks
381	331	Engineering and Scientific Instruments
382	332	Measuring and Controlling Instruments
383	333	Optical Instruments
384		Medical Instruments and Supplies
385		Ophthalmic Goods
386	336	Photographic Equipment
387		Watches, Clocks, and Watchcases

DES	DMD	Industry Title
Limited to above manufacturing industries; DES does not include any nonmfg. in its definition	737 (Selected from 739) 7391 & 7397 7392 891 892	Computer Programming Services (Misc. Business Services) Commercial Research, Development and Testing Labs Business Management and Consulting Services Engineering and Architecture Services Non-profit, Educational Scientific and Research Organizations

Selection Basis

DES - Selected 20 industries in the manufacturing sector. Companies in this group have a high ratio of scientists and engineers to total labor force; have high growth rates; high ratios of research and development (R & D) expenditures to sales; and have high value-added products. Also comparable data for these SICs are available from all states and are consistent over time.

See: High Technology Employment: Massachusetts and Selected States 1975-1981, Massachusetts Division of Employment Security, July 1982.

DMD - Defined high technology industries as those whose share of engineers, scientists, and technicians exceeded the durable goods manufacturing share of 13.7%, for industries specified at the three digit level of detail (SIC).

See: Defining "High Technology" Industries in Massachusetts, Department of Manpower Development, September 1979.

APPROVAL REQUIREMENTS

STEP 1: Each candidate must:

- 1) be a citizen of the U.S.A.
- 2) be a high school graduate or possess a high school equivalency certificate.
- 3) have at least six years of recent, continuous full-time experience in the area of approval.

STEP 2: After Items 1, 2 and 3 have been satisfied, each candidate must:

- 1) Pass a practical skills test and, also, a written test that has to do with processes of the occupational area, i.e., indicate the distinct steps that are necessary to perform a task (of that occupational area) efficiently and correctly as per the ongoing state-of-the-art of that occupational area.
- 2) pass a written related mathematics test in the area of approval.
- 3) pass a written related science test in the area of approval.
- 4) pass a personal interview given by two test supervisors.
- 5) present evidence of having earned 18 semester hours of college credits, the content of which will be determined by the Division of Occupational Education. Provisional approval may be allowed without the 18 semester hours for a period no longer than three years from the date of notification of provisional approval.

The content of the 18 semester hours of college credits should be specifically related to occupational education teaching.

STEP 3: In order to maintain full approval, approved instructional personnel for vocational programs shall document to the satisfaction of the Division of Occupational Education the acquisition, every two (2) years, of sixty hours of further on-the-job experience, arranged by a local education agency in conjunction with an employer.

The contents of all tests will be developed by test developers. A test developer may be either of the following:

- 1) A vocational teacher approved in the test area; or
- 2) A practitioner in the test area possessing qualifications equal to or greater than those listed in Step 1, 1 through 3.

The supervision of all tests shall be done by individuals with the same qualifications as test developers and shall be known as test supervisors.

The selection of test developers and test supervisors must be done in an open and public manner.

All tests and grading must be approved by the Division of Occupational Education.

RATIO BETWEEN SHOP AND RELATED TIME

Recent budget cuts have resulted in the layoff of teaching personnel. In some cases, this has meant the reduction or elimination of related subjects from courses of study. Such related subjects include mathematics, science, drawing, schematics and shop processes.

The required ratio of time spent in shop or lab to time spent in the related class, traditionally and by requirement of the Division of Occupational Education, has been 2-1. This rigid ratio indicated an awareness of the need for related subjects. When it was eliminated, the credibility of the Division of Occupational Education was lessened in the eyes of any serious vocational teacher.

Some people say that any instruction given by a teacher to a student under normal shop or lab conditions can be considered a form of related work. This cannot be considered a sincere and honest professional opinion by any who understand the learning process on the high school level.

What is so important about restoring the 2-1 ratio between shop or lab time and related time? And why should the related subjects be taught in a classroom setting?

In the classroom, the teacher directs the students' attention to the problem at hand. All students work on the same type of problem. The teacher shows how to solve the problem; the students practice the process. In the end, the students are tested and then can go into the shop or lab prepared to do this type of work.

Imagine a group of students in a shop or lab--usually two grade levels at a time--with one teacher and no chance for a classroom-type related program. There has been no job or project preparation. In the shop or lab, the students are working on a variety of problems at different levels of difficulty. An alert and motivated student may recognize an unfamiliar procedure without the teacher directing his attention to it. That student then may ask for help or research it on his own.

When faced with a problem they cannot solve, the vast majority of students will not ask for help or do any serious research on their own. They either will fumble through it and finish the project--never learning the proper steps--or lose motivation and give up altogether. When the teacher is instructing a student, the teacher's attention cannot be fully on the problem but must be split between the student he is helping and the remaining twenty or so students who may be operating power saws, routers or lathes, or who may be involved in wiring a live circuit.

In a "no related taught" situation, the student is removed from all identification with her shop or lab for a week or two, depending on the shop/academic cycle practiced in the particular vocational-technical high school. When the student arrives back in the shop or lab after her

academic cycle, he has lost most of the knowledge he had learned during the previous shop cycle.

In a "related taught" situation, the student's occupational identity is reinforced each day, for she never truly is separated from her vocational major.

With the "high tech" atmosphere that has developed over the past few years, all occupations are in a state of flux. The shop and lab teachers know that there are new units they should include in their courses of study, but because of the "no related" situation that exists in some vocational-technical high schools, they feel that the purchase of "high tech" tools would be a waste. They know that, at their best, they are unable to prepare a great number of students to execute even the elementary traditional units of the occupation. Fifteen hundred hours of a student's life can be wasted because of a "penny-wise, pound-foolish" attitude by those in whose charge he or she has been placed.

RELATED TEACHERS' APPROVAL (SAME AS SHOP & LAB)

If there is any doubt about the importance of related mathematics and related science as an integral part of any course of study, one only has to imagine a student doing a research paper without first learning how to read or write, or doing a physics lab project without first understanding the required mathematics. The importance of a related program should be unquestioned.

The related teacher is responsible for the students learning the mathematics and science that will enable them to perform the shop and lab projects with ease and efficiency. The related teacher also must make the students aware of safety in the shop.

Probably the most subtle advantage of having the related teacher approved in the appropriate occupational area is the relationship between student and teacher. The student usually holds the shop teacher in high regard. This is because they share a common identification. When the related teacher shares the same occupation identification as the student, the learning process is improved.

A good related course pivots around the projects to be done by the student in the shop or lab. In the related room the student is prepared for the projects. The quality of the related instruction effects the quality of the student's projects in the shop or lab. It is logical, therefore, to conclude that the related instruction must be given by a teacher approved in the particular occupational area.

CLUSTER-TYPE PROGRAMS

Vocational-technical education today is standing in the doorway of opportunity. It finds itself in a time of industrial change. There is a great deal of uncertainty, especially in the product manufacturing industries, regarding the skills that are and will be needed to produce the products of today and tomorrow.

Massachusetts is an expensive state in which to live. It certainly must be an expensive state in which to operate a high-energy-using manufacturing plant. Despite the cost, there are many factors that make Massachusetts attractive to manufacturers. One of these factors has been the work attitude of its people. If the people are well-educated and well-trained, industry will seek us out. If the people are not well-educated and well-trained, industry will, of course, not establish in Massachusetts and the industries that are here eventually will leave. Due to the dramatic changes in the tools of production, skill requirements within occupations also are changing. The degree of change is uncertain at this time, but the reality of change is certain. We, the members of the Council, can better advise the Division of Occupational Education regarding curriculum development if we recognize this change and understand that uncertainty is a temporary by-product of new development.

In this atmosphere of change, a fourteen-year-old student should be offered several career options. A course of study that is broad and well-organized and that will develop entrance-level skills in several occupations, should be offered to all high school vocational-technical students. This type of program can be described as "vocational clustering".

Presently in vocational-technical education, the average student attending high school spends approximately six hours a day, ninety days a year for four years in a shop or lab. If the student is fortunate enough to be involved in an occupation whose shop is supported by an adequate related program, we can add 1,000 hours to the shop time and arrive at a 3,000-hour course of study.

Let us think about what we are doing. We are allowing fantasizing fourteen-year-olds to select a single, narrow occupation that may direct their entire journey through life.

Vocational-technical clusters can be defined as a selection of occupations related in an industrial sense, not in a cognitive or psychomotor sense as previously has been done. Examples of clustering titles are: construction technology cluster, appliance technology cluster and manufacturing technology cluster. A chart suggesting content/time distribution for the manufacturing cluster is attached (attachment 4-A).

The cluster method is advantageous to students and employers alike. Employers will benefit from the students' broader knowledge. Students will profit by:

- 1) being motivated to do well in their occupational discipline.

- 2) being provided with the opportunity to change their occupational priorities within determined broad limits.
- 3) better understanding their role relative to others in the industry.
- 4) having a wide selection of employment opportunities.
- 5) being better able to recognize their capabilities as a result of involvement in a broad occupational program.
- 6) becoming aware of the opportunities of specialization in the engineering and science fields.

The local educational agencies will increase their level of efficiency not only educationally but also in regard to the use of facilities. As an example, the electronics lab presently is available to forty different students in any given year. Within the manufacturing technology cluster, it would be available to four times that number.

A PORTION OF STATE MONEY AND/OR CONTRIBUTIONS FROM
THE PRIVATE SECTOR MUST BE EARMARKED FOR NEW EQUIPMENT

In 1983, when arguments were being heard regarding the "Vocational-Technical Education Act of 1983, Congressman Carl Perkins listed the bill's highlights with the following (abridged) statement: "Some of the highlights of the bill are: a sharper focus on modernizing programs, attention to special populations, and new sections for high technology, industry-education partnerships, and adult training and retraining." We have concentrated on the first highlight: modernization. None of the others will be effectively served if the first is ignored.

The word "modern" means "to belong to the present mode." In vocational-technical education, belonging to the present mode means that the curriculum within each vocational school includes those skills that are marketable, or lead toward marketability, and that the equipment is compatible with the development of those skills.

Once the State determines that it has the obligation to modernize vocational-technical education by the development of statewide standard courses of study, it will be expected to provide the equipment needed to satisfy that mandate. This standardization will take at least three years to start. Meanwhile, things cannot be allowed to remain in limbo.

The establishment of the Massachusetts High Technology Council, Inc. has given industry as a whole an organized voice in determining its future. The High Tech. Council was formidable in working for the passage of Proposition 2½. At approximately the same time, it sponsored a survey of projected occupational growth within Massachusetts.

Because of the loss of funds to vocational education as a result of Proposition 2½, local vocational educational agencies have been unable to purchase the equipment needed to prepare for this expected occupational growth. We can conclude, therefore, that in the interest of society in general, industry should feel a responsibility to help provide relevant instructional equipment. The Commonwealth should earmark some of the money returned to the cities and towns each year for this equipment, keeping in mind that Massachusetts is fundamentally and historically a manufacturing State, and one that always has found pride in quality education.

Since there has been a beginning of business-school partnership, this effort should be increased to provide relevant instructional equipment and software. This will require a considerable additional investment of time, effort, money and dialogue, from both business and education.

STATE MONEY MUST BE EARMARKED FOR TRAINING TEACHERS

The same arguments can be made to justify the cost to train teachers in the use of relevant instructional equipment as were made to justify the purchase of this equipment.

The most logical way to learn how to use new equipment is from the equipment vendors. The vendors usually include the cost of training in the cost of the equipment. Some vendors do not offer a training course, thus reducing the cost of the equipment.

If the State does develop statewide courses of study, the courses themselves will dictate the type of equipment to be used. The State can, therefore, purchase new equipment at the same time for several schools and require both the teachers and vendors to assemble in one place (for example, the Fitchburg Conference), thus minimizing the cost of training teachers on the new equipment.

CRITERIA FOR PROGRAM EVALUATION

Presently the two criteria used for evaluation are:

- 1) Placement of completers in an occupational area relevant to the training received; and
- 2) The degree to which employers consider vocational-technical education completers to be well-trained.

Realizing these are federal requirements, we nevertheless advise the Division of Occupational Education to consider the real credit shown to vocational-technical education when one of its graduates chooses to go on to higher education. When a graduate chooses to go into the service of his or her country, we cannot accuse education of failing that young person. When a graduate elects to direct his or her vision to other honorable goals, we cannot lament on how we have failed that student.

When a fourteen-year-old makes a decision on a lifetime career, he or she frequently is making a decision based on information only partially understood. Unrealistic expectations fill the spirit of the young. Oftentimes, youngsters have no expectations at all.

Youth and young adulthood is a time for constructive experimentation. We in vocational-technical education must not stunt the professional growth of any of our students. We offer those put in our charge a meaningful, realistic educational experience, one which they will not receive in a bookish, two-dimensional academic environment.

Vocational-technical education should reach out to all of America's students and allow them to develop those technical skills that are slowly taking shape in the new manufacturing techniques.

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